

BriteLite

For many decades, Jansma Lichten has been one of the most successful lamp producers of The Netherlands. The company was founded in 1923 as 'Lampenfabriek Jansma' and renamed in 1974 to Jansma Lichten. The company's most successful period dates back to the period between 1960 and 1980. At the start of the eighties, the company experiences a small setback, after which the nineties brought about a new period of growth. During that period, Jansma Lichten invested large amounts of resources in new production facilities and techniques for the highly successful line of light bulb and light bulb fittings. Unfortunately, since 2001 the Dutch need for incandescent light bulbs started dropping rapidly year over year and as a result, Jansma Lichten was left with diminishing turnover and high costs. As a result of the current financial crisis, the company experienced yet another setback, due to the retreat of several key investors. Halfway through 2009, the company was well on its way to become bankrupt when a few new big investors were contracted, under the condition that the current board of directors would make way for a new team that could change the strategic course of Jansma Lichten and revive its business.

The new Board is planning a major strategic shift for the lamp manufacturer. Among other things, the company will shift its focus from the national to the international market. Therefore, the company is going by its new name since January 2010: BriteLite.

1 Market Information

BriteLite is offering its products and services in the market for conventional light bulbs as well as the market for corresponding fittings. Alongside these manufactured products, BriteLite offers both maintenance services and consultancy services on the application of conventional light bulbs in (mostly) industrial and public environments.

1.1 Market figures

The table below provides some information on BriteLite's market volume, market share and annual turnover.

	1975	1980	1985	1990	1995	2000	2005	2009
Dutch Market volume of incandescent light bulbs (x mln)	76.7	81.2	86.8	87.2	84.6	79.0	53.9	34.6
BriteLite dutch market share incandescent light bulbs	13.2%	12.6%	11.1%	12.9%	15.3%	17.1%	19.3%	17.8%
BriteLite maintenance turnover (x 1000 €)	1200	1130	1350	1600	2070	2200	2540	2300
BriteLite consultancy turnover (x 1000 €)	0	0	0	150	315	480	765	1050

1.2 Trends

In recent years, a number of distinct trends can be identified. First of all, in the consumer segment the conventional light bulb is steadily losing popularity in favor of more energy efficient alternatives such as the compact fluorescent tube and LED-lights. The figures below support these identified trends.

	1999	2001	2003	2005	2007	2009
Dutch market volume of compact fluorescent tubes (mln)	68.7	77.1	89.3	97.8	112.0	125.4
Worldwide market volume of compact fluorescent tubes (mln)	3190	3320	3480	3700	3970	4250
Dutch market volume of LED lights (mln)	1.7	3.2	5.1	8.7	14.8	23.9
Worldwide market volume of LED lights (mln)	56	69	108	280	710	1280

The market for incandescent light bulbs is shrinking rapidly and will be non-existent soon. The last big producers are all trying to sell their stock as fast as possible. The clients that still demand incandescent light bulbs are the ones that have very specific needs and are likely to rely on incandescent bulbs for years to come. Hence, these clients demand large amounts of light bulbs and the quality and durability of the bulbs is currently the most important aspect for them. Furthermore, the quality of the products is the only means to diversify from the competition. One of the main drivers for a strategic shift was the loss of an important bid for such an order in 2008. The preparations for this bid took several months and were extremely costly, due to the research that

went into the development of an extremely durable and high-grade light bulb with excellent color rendition.

1.3 Environmental issues

One of BriteLite's main concerns is the ever-increasing focus on environmental issues and green development. Several environmental activist organizations and animal rights groups are increasing pressure on the producers of light-emitters, in order to motivate them to move towards the production of more energy-efficient products and a lower carbon-footprint for the organization as a whole. In recent years, the European Union (EU) has decided to stimulate the transition towards more energy-efficient lighting by announcing a complete ban on incandescent light bulbs. Starting from September 1, 2012 incandescent light bulbs are no longer allowed to be sold in the EU. Also, since September 1, 2009, the production of incandescent light bulbs with matte coatings are prohibited.

For Animal right groups, the main argument against incandescent light bulbs (and conventional light emitters in general) is the fact that the heat generated by these products attracts animals. This is a big problem on oil rigs, as the birds are staying out on the rig too long and subsequently never make it ashore when they need to return for food. Therefore, animal rights groups are particularly enthusiastic about the use of LED technology, due to the limited heat that comes off of these light emitters.

Most of BriteLite's competitors have already made the change towards the production of the more efficient and popular alternatives, of which the LED technology and halogen lights are the most prominent. The biggest downside of LED technology is the color temperature of these lights; the basic color temperature is 'cold' and the more natural and warm color temperatures are very hard to mimic. However, the stable color temperature of LED lights is also a big advantage for the application of the technology in color-sensitive environments (such as the graphic sector).

2 Products and Services

BriteLite offers different products and services such as lamps for different segments, maintenance services and consulting. Each of these are detailed below.

2.1 Lamps

BriteLite produces and offers the following lamps. Every product has distinct characteristics and is targeted at different market segments, most notably household usage, the graphic sector and industrial use. Price ranges are so different that, in the past, there was hardly any cross over. However, as of late BriteLite's sales representatives found that several industrial clients started using the household series to cut on their costs.

Incandescent light-bulb for household use:

- Regular series: R15, R20, R30, R40, R60, R90 and R150.
- Comfort series: C15, C20, C30, C40, C60 and C90.
- Comfort+ series: C20+, C40+ and C60+.

Incandescent light-bulb for graphic sector

- ReliaBulb 3500K: RB3500-40, RB3500-60.
- ReliaBulb 5000K: RB5000-40, RB5000-60.

Incandescent light bulbs for corporate and industrial use:

- Ultra series: U25, U50, U75, U100 and U150.
- Ultra+ series: U25+, U50+, U75+, U100+ and U150+.

Sodium-vapor lamps for industrial use:

- Power series: P25, P50, P 75 and P100.
- Extreme series: E50, E100, E150, E300 and E1000.

In the table below a number of additional specifications for the above-mentioned products are provided.

Product serie	Life expectancy	Color temp	Color stability*	Efficiency	Quality**
Regular	800 h	2500K	0.22	10 lm/W	2
Comfort	750 h	3000K	0.18	11 lm/W	1
Comfort+	1200 h	3000K	0.19	11 lm/W	1
ReliaBulb 3500K	1100 h	3500K	0.014	9 lm/W	0.1
ReliaBulb 5000K	800 h	5000K	0.022	8 lm/W	0.1
Ultra	900 h	2500K	0.26	10 lm/W	1
Ultra+	1400 h	2500K	0.26	10 lm/W	1
Power	18.000 h (P75, P100) 25.000 h (P25, P50)	1800K	0.56	100 lm/W	5
Extreme	12.000 (E1000) 20.000 (other)	2000K	0.68	95 lm/W	5

* The guaranteed maximum variability in color temperature over the life of the lamp. Measured in relation to the specified color temperature of the light produced by the lamp. A lamp with a standard color temperature of 5000K and a color stability of 0.6 is guaranteed to always have a color temperature between 2000 and 8000 K (5000 plus or minus $0.6 \cdot 5000$).

** The maximum number of faulty units for every 1.000 products.

Conditions and Constraints

The various light bulbs of BriteLite are available under different conditions and constraints, as presented in the following overview:

Sales-channels:

- The household series (Regular, Comfort and Comfort+) are only available through resellers.
- The ReliaBulb series are only available for sale through the webshop of BriteLite.
- The light bulbs for industrial use are only available for order in quantities of 250 pieces (Ultra and Ultra+ series) and 500 pieces (Power and Extreme series).

Production strategy:

- The production of the household series and the series for industrial use are fixed.
- The production of the ReliaBulb serie is based on the demand for the light bulb and a 4-week inventory buffer is used to manage the production.

Additional company policies relating to the production and sales of lamps:

- Corporate customers are eligible to make use of BriteLite's standard Service Level Agreements (SLA's) when they order at least 1.000 items of a single product.
- The Power and Extreme series may only be sold to registered corporate and governmental customers.

2.2 Maintenance

BriteLite offers specialized maintenance services for industrial clients and environments. This not only includes the repair and replacement of both its own and other types of lamps and fittings.

BriteLite offers two types of services: regular service visits and a 24/7 emergency service. The 24/7 emergency service is only available as an extension of the regular service contract. BriteLite offers a standard contract for regular clients and only makes specific agreements with its key customers. The provided service (-quality) is documented in SLA's, which should at least provide the following information:

- The type of maintenance activities that are part of the contract and thus performed by BriteLite.
- The timeframe in which BriteLite responds to service requests by the customer.
- The quality (in terms of the number of errors per 10.000 burn hours) of the acquired BriteLite products.

2.3 Consultancy

Since 1995, BriteLite is offering consultancy for the appliance of artificial light in professional environments. This part of the organization has gained more and more focus in recent years, as ergonomics and light quality has become more important in work environments.

During a consultancy job, a BriteLite consultant works together with the client to determine the client's needs, after which the consultant will work out a lighting plan for the client.

Currently, the consultancy branch of BriteLite is extremely flexible due to the fact that it lacks any formal structure or organization and operates on a job-to-job basis. However, many consultants have a specific area of expertise and are not always available when a job in that area comes along.

3 Organization

Currently the organization of BriteLite can be characterized as a typical hierarchical organization. At the top is the Board of Directors. The organization exists of three business lines: Production, Engineering and Consultancy. These business lines are marketed externally as BriteLite, BriteLite Engineering Solutions and BriteLite Ideas respectively.

At enterprise-level, BriteLite has two staff departments: a small marketing department (one marketing manager and four marketeers) and (since 2002) a Sales and Account-management department (three sales and account managers, of which one has the role of department manager).

Each of BriteLite's business lines has its own Finance & Accounting department, which are responsible for all administrative tasks, such as order and payment processing and customer relationship management.

The following business functionality has been outsourced to external organizations: Legal, Research & Development, and ICT support. There is a small exception on the latter: the production business line also has a small ICT department for the maintenance and support of the organization's legacy applications, website and webshop. This ICT department also coordinates the application of external ICT support throughout the BriteLite organization.

The marketing and account-management staff at BriteLite's headquarters have been using a CRM-solution from the Arocle vendor that supports them in their daily work. The system - which is mainly a big Oracle database from this vendor with a graphical front-end - holds all customer information. Each interaction with clients (either on the phone or after customer visits) is logged in this system. A small addition to this system (BriteCampaign) was custom-developed to support marketing campaigns. The application is hosted on the Oracle Virtual Server farm which runs on HP Blade hardware. De graphical front-end is web based and can be accessed by BriteLite employees using a HTTPS connection.

3.1 Business Line: Production

The Production business line is basically the original Jansma Lichten organization with a few small exceptions; some business functions have been migrated to the enterprise level. The Production business line exists of a small ICT department (an ICT Manager and four employees), a production department and a customer support team with a small call center. The production department exists of two staff departments (inventory and distribution) and two sub-divisions, of which each are responsible for one of BriteLite's two main production sites: Dordrecht and Veghel. The distribution center is located at the Veghel site and the four employees of the inventory are managed by this location's site-manager, who also manages the employees of the Distribution department. The Dordrecht location also has a small inventory, with two employees, managed by the site-manager.

The Administrative Organization (AO) of the production business line is realized by a structure of line managers: each production site has a Site Manager who manages the on-site production teams, which exist of multiple production workers. Each site also has a quality controller, who is responsible for the quality control and (when needed) the quality recovery processes at the location.

Jansma had several old IT systems that were mostly "home grown". The L-info system contained specification of all lighting products ever developed by Jansma. Furthermore, a system was developed that supported inventory management (both of raw materials and finished goods), production planning, production quality control and shipment tracking and tracing. The latter was recently added, after handling customer questions with respect to arrival dates and times of shipments were increasingly hard to track.

It was increasingly difficult to maintain the Cobol-based system and the original developers have long since left the company. The L-info system is still in use and is hosted on a AS400 Mainframe environment. The other system, even though it still worked well and fitted its purpose, was recently replaced with a modern ERP package from the ZAP vendor, much to the frustration of Arocle which hoped to land another big deal at BriteLite. The main motivations for the ZAP-vendor were the *no vendor lock-in principle* and functionality that is more suitable for the lighting industry.

The ZAP solution is hosted in-house with a fail-over solution: each of the two locations in the Netherlands has a copy of the system that is constantly synchronized. However, maintenance of these systems is outsourced to ZAP as BriteLite did not want to end up with hard to maintain legacy system of its own again. The ZAP solution runs on a Unix server cluster. In order to be able to synchronize the two systems securely, BriteLite implemented a Cisco firewall which connects the LAN's of both locations via a regular internet connection. The ERP system maintains a connection with the OrderPRO order administration system, which runs on a UNIX system at the Veghel location.

As part of the deal, ZAP has promised to train all BriteLite's employees in the production department in order to make the transition to the new system easier. So far, only half the personnel have been trained. All in all, the migration went relatively smooth and the production staff is happy with more modern IT support for their daily tasks.

3.2 Business Line: Engineering

The BriteLite Engineering business line has a total of 34 employees and exists of four teams, each with their own specialty: corporate lighting (eight engineers), industrial and public lighting (nine engineers), complex circuitry (five engineers), and modern lighting products (six engineers). Each team is led by a team manager and assignments are either performed as a team from a single team, or a multidisciplinary team. A central engineering coordinator is responsible for the coordination of all assignments and ensuring proper availability of personnel in case of emergency assignments. Additionally, a secretary is responsible for handling phone calls and specific administrative tasks.

The engineering department uses little IT-support for its work. The E-support system receives work orders from the Arocle system used by Account management. This system supports workload handling (i.e., engineers record their activities in E-support). Only when a case is fully completed is a record sent back to Arocle. E-support also has a route planning system and interfaces with L-info so that engineers have direct access to specifications of lighting solutions. An interface to the new ZAP-system is still in the works, as engineers frequently have to look-up inventory and pricing information of parts for their work. E-support is a SAAS solution.

3.3 Business Line: Consultancy

The BriteLite consultancy business line is a much more ad-hoc type of organization with far less hierarchy than the production business line: it consists of a single manager with 11 consultants and a secretary.

BriteLite's consultants are on the road for 80% of their time. Therefore they all have a laptop with mobile connections directly (using VPN#) into the corporate network. Authentication is based on a RSA-token.

Consultants work closely with the Account management department and share their IT-systems. Even more, they use a document management system (DMS) called TeilPunkt. This system is Windows based and uses a simple database for storing files.

TeilPunkt is used to store rough sketches of solutions as well as other documents (e.g. photos and drawings of client locations, materials received from customers etc.) are stored. The use of this DMS has little formal rules and therefore finding relevant information is not always as straight forward as it should be. So far, however, the consultants have managed to make it work to their advantage.

When consultants actually make a sale of a custom lighting solution for a client, a folder is created on the DMS that contains all relevant information for production to actually craft the product, and for engineering to install it. Due to the wide spread use and importance of its content for the enterprise, governance will soon be migrated to corporate IT. This will also involve a "clean-up" of its contents, storing files on the corporate SAN#, as well as the institution of more rules and guidelines for its use.

3.4 Business Line: Production

3.4.1 Production department

For the production of its lamps and fittings, BriteLite has a number of production lines in two separate production plants: the original plant in Veghel and a more modern plant in Dordrecht, which was built in 1978 to accommodate for the production of the sodium-vapor lamps and the more sophisticated ReliaBulb series. Dordrecht was chosen for its strategic location close to the Rotterdam harbor.

On occasion, BriteLite also outsources bulk production to a plant in Brno in the Czech republic. This mainly occurs when demand spikes at moments that BriteLite's own production capacity is too low. The advantage of this arrangement is that the utilization of BriteLite's expensive equipment and staff in the Netherlands is high, while production capacity remains flexible. Unfortunately variable shipping rates make price estimates unreliable. Also, the quality of materials obtained from Brno is low.

BriteLite has a number of different production processes, which are explained below. The glass and copper elements of the lamps are produced separate from each other and are then assembled into a single light bulb within the glass production & assembly line. Some basic processes are equal for all production lines.

At the start of each day, the Team Managers of the production lines check the ERP system to determine the production schedule of the day. The ERP system provides the Team Manager with an overview of the outstanding 'production runs' (orders separated per product) and their priority. Within the ERP system, the Team Manager then creates a production schedule for the day based on this information and his own experience. This schedule then describes the products that will be produced and in which order and quantity. A schedule exists of (one or more) production runs, split

into batches of 100 products. Each production run is assigned to an order number, which can be traced back to the original order and client.

Production of the filament and base

The BriteLite Dordrecht site houses two modern production lines for the production of all copper and metal elements of BriteLite's lamps; one for all incandescent bulbs and one for the Sodium-vapor lamps. These highly automated and flexible production lines are operated by no more than two production workers per line.

At the heart of this type of production line is a computer with a UNIX operating system, which is wired to the central networking server of the Dordrecht site. On this computer, OTOMATIC controller software controls the behavior of the machine itself. The software also provides an interface at which the production schedule can be entered in advance. This schedule is saved and maintained on the machine itself; after each completed batch, the status of this batch is updated in the schedule. This OTOMATIC controller also keeps track of the throughput time per batch and documents this in the production log. Both the schedule and the production log are maintained in a MySQL database on the same computer. External applications can read this information by making use of a standardized application service provided by the OTOMATIC controller.

Machine specifications:

Maximum throughput: 3.500 pcs/hour

Raw material capacities: copper 500 kg, batch packaging: 100 pcs, labels: 10.000 pcs.

Process: At the start of the day, the production worker inputs the first two production runs of the production schedule on the production line. This takes about 10 minutes, and after that the production line will reconfigure itself automatically when needed (a switch between products), which also takes about 10 minutes each time.

Two production workers monitor the production process and intervene when needed, for example in case they notice any irregularities along the production belt. The production line is also able to detect potential problems, in which case it will provide an audible and visible signal and additionally even halt immediately at an indication of serious problems (such as increased resistance in the machinery). A detection is signaled by means of an audible alarm and flashing lights at the location of the problem. If the production worker does not discard the signal (by either pressing the 'ignore' or 'stop' button) at the signal location within 30 seconds, the machine will halt by itself. After a complete stop, a safety measure is put in place, which prevents the system from starting again within 15 minutes, which is roughly the time required to clean the whole line of all half fabricates with two persons. The system detects (and signals) a pending shortage of raw materials (such as copper or packaging) and a delay at the offloading band, after which the production worker can either discard the signal and refill the raw materials (5 minutes for copper, 10 minutes for packaging) within 10 minutes, press stop, or do nothing, after which the machine will stop by itself after 10 minutes.

At the end of the production line, every batch is packaged automatically in cardboard boxes and a label is added with the code of the production run, the batch number and the order number. A production worker then loads the packages onto pallets (90 per pallet, which takes about 10 minutes) and transports the pallet to the distribution area by forklift truck (3 minutes), after which he picks up an empty pallet and brings it to the production line (2 minutes).

Each time a production run is finished, a production worker will need to add a new run in the interface of the production line, so that the buffer of production runs is maintained. If the production worker fails to do so, the machinery will be brought to a halt at the end of the last production run and the 15-minutes safety mechanism will apply. Furthermore, the following rules apply for the production workers:

- No new production runs of 10.000 lamps or more are added after 3pm.
- No new production runs of are added after 4pm.

Of course, the team manager is aware of these rules and tries to create the most efficient schedule. This is often fairly difficult, due to the fact that orders may have different priorities (standard or express) and the loss of time due to reconfiguration of the machine needs to be limited, which means the team manager will try to place orders of the same product after each other.

At the end of the day, the production workers append the production schedule with the status of each production run and any irregularities found or experienced during the production. The Team Manager then processes this information back into the ERP system, which subsequently also updates the information in the OrderPRO system.

Production of glass bulb/Assembly

BriteLite has two production lines for the production of glass bulbs. The first and oldest production line is located in Veghel and is only used for the production of the glass for the incandescent light bulbs, with exception of the ReliaBulb series. The second production line is located in Dordrecht and is mainly used for the production of the ReliaBulb series and the glass of the sodium-vaper lamps. In case extra production capacity is needed for the production of regular glass bulbs, this production line can also be used to temporarily increase production capacity.

Machine specifications Veghel:

Maximum throughput: 2.000 pcs/hour

Raw material capacities: glass 1.000 kg, unit packaging: 10.000pcs, batch packaging: 100 pcs, labels: 10.000 pcs.

Machine specifications Dordrecht:

Maximum throughput: 4.000 pcs/hour

Raw material capacities: glass 1.500 kg, unit packaging: 10.000pcs, batch packaging: 100 pcs, labels: 10.000 pcs.

Process: For each production run, the production worker checks the provided production schedule to determine the type of bulb that needs to be produced and reconfigures the machinery (if needed) to produce these products. Reconfiguring the production line takes about 45 minutes on the old line in Veghel and 25 minutes on the line in Dordrecht.

The actual production of glass for the lamps proceeds in eight stages. First, a production worker loads raw glass on one production belt and the proper bases/filaments on the other. The glass is then heated (2), after which it is injected into molds (3). These molds then pass a number of air nozzles that blow the bulbs into the correct shape (4). Further along the production line, the bulbs are being cooled down by air (5) and the cooled bulbs are cut from the belt itself (6). In the 7th stage, the cut bulbs are glued to the base of the lamp and in the last (8th) stage each lamp's packaging is folded and the lamps are slid into the package. Every batch is packaged in a larger cardboard box with a label for tracking capabilities. During this entire process, production workers need to monitor the state of the machinery and act when necessary.

In case of a signaled production error or problem, the production worker can press one of the 'stop' buttons, which are located at each of the eight stages. The machinery is then brought to an immediate hold at that stage and all stages in front of it. A second press of the stop button will also bring the stages further down the line to a complete stop. The machinery should then be serviced and all material that is stuck on the belt has to be removed manually before the machinery can be started again. Neglecting this guideline might result in heavy damage to the machinery. The time it takes to clear the machine of fabricates and perform a final check of all machinery by one production worker is roughly the following:

Stage:	1	2	3	4	5	6	7	8/all
	15m	30m	1h	1h30m	2h	2h10m	2h20m	2h30m

Currently, the production belt is stopped on all errors that are signaled during production by the production workers, in order to prevent the machinery from damaging and limit the production of faulty products. As such, these includes errors visible on the production line itself (such as broken glass), without the need to test the final products.

Quality Control

Quality Control takes place at the end of the glass production/assembly line, where one in every batch of 100 end products is tested manually on a testbed. Every hour, the quality controller takes one lamp from every batch and mounts it on the testbed. While doing so, the controller scans the barcode on the packaging-label of the batch. The barcode scanner is attached to the QPlus system, which runs on a Windows 2000 environment. The system is connected to the OrderPRO system and the status of the quality control is send automatically to the OrderPRO system. When quality control is finished, the controller closes the batch on the QPlus system, which sends all documented information to the OrderPRO system, where it is stored in the order information. QPlus maintains a copy of all this information in its own proprietary database.

The lamps are tested on power tolerance and color temperature. Lamps that are 'within spec' are put back into the batch, which is then physically marked to be taken to the distribution center. In case of any problems, another ten lamps from the same batch are tested. If no other faulty lamps are found, the faulty lamp is replaced and the batch is also marked as ready for distribution. However, if another faulty lamp is found, the whole batch is set aside and examined on the cause of the fault. Quality Control adds all irregularities into the OrderPRO system.

In case of evident problems with the machinery, the quality controller contacts the relevant department/persons within BriteLite and an ad-hoc process unfolds. BriteLite would like to create a lean process in which the type of quality error is documented and strict processes govern the action taken upon certain types of errors (such as problems with raw material or at a certain stage of the production line). As of yet, this is not possible, due to restrictions in the QPlus system and its limited abilities to communicate with other systems.

However, the following list of quality control codes is used to document the types of problems (multiple codes are possible).

- 0 - Passed Quality Control
- 1 - Complete product failure
- 2 - Product out of tolerances
- 3 - Aesthetic failure
- 11 - Human error
- 12 - Transport error
- 13 - Machine tool failure
- 14 - Defective raw material
- 21 - Assembly error
- 22 - Glass production error
- 23 - Base production error
- 24 - Filament production error
- 99 - Undefined error

3.4.2 Inventory department

Every BriteLite location has its own inventory management and warehouse to store its products. All information regarding inventory management is maintained in the ERP system. Here, two main processes can be identified: intake and outtake (of both BriteLite products as well as raw materials and such). Of course, the BriteLite products are tracked by means of the barcodes on the packaging labels.

3.4.3 Distribution department

The main distribution depot of BriteLite is still located in Veghel, but extra storage space in Dordrecht will be available within 1.5 years. The distribution depot will then be moved to Dordrecht, a far more strategic location. BriteLite has a total of four caddies and eight trucks. The trucks are mainly used for transportation between the two sites and the delivery of large orders. The caddies are used for the delivery of small orders within a range of 50km of the Veghel location. For the distribution of small orders to distant locations, the trucks are used to deliver the products to a third party distributor in Den Bosch.

Two processes can be identified: distribution (transport between BriteLite sites or to 3rd party distribution sites) and delivery (to clients). This department has a manager and 14 drivers. The drivers use PDA's with 3G internet access and a connection to BriteLite's OrderPRO system, to automatically update the delivery status of orders.

3.4.4 Finance & Accounting

The accounting department of the production business line is responsible for the acquisition of raw materials, order processing, billing and payment processing. The underlying processes are supported by the OrderPRO (order processing, billing and payment processing) and ERP (acquisition) system.

3.4.5 Additional information

BriteLite offers a webshop, which is integrated in BriteLite's website and hosted at an external hosting provider. The webshop is connected to the L-info and OrderPRO system. Registered clients can track their orders through a secured part (by means of the HTTPS protocol) of the webshop. Orders are subsequently created and maintained in the OrderPRO system.

4 Assignment 1

BriteLite is currently in heavy weather and its management has decided that it is time to get the house in order to be able to focus on the future. After having visited many trade shows, consulted with state of the art literature and extensive research online, management has decided to hire architecture consultants to help them get organized.

As growth at BriteLite has been rather organic, BriteLite's management has decided to take a two-pronged approach. First, management wants to gain insight in the status quo. You are asked to present ArchiMate models to give management insight in current state of at least:

- A product architecture: which products and services does BriteLite offer, and how are they delivered?
- A process architecture: which processes are in place, and how do they relate? This should be tied directly to the organization structure
- Insight in organization structure
- Application architecture: what does the current IT landscape look like, and how does it support business?
- Information architecture: what type of information is used by the business, and where is this information stored
- Infrastructure architecture: what does the infrastructure architecture look like, and how does it support IT?
- An overall diagram which management tends to call "context diagram". This diagram shows a high-level, 10.000 foot overview of the architecture of BriteLite. No further details on this are supplied

4.1 Assignment 2

Management will use the models/views you have created to decide on further action. Options that are being considered are:

- Overhaul the IT landscape:
 - Outsourcing all IT-related work, including hosting, development, and maintenance
 - Replacing the entire IT landscape with a centralized system

For the IT-optimization, management asks you to do a high-level analysis of what the desired architecture would look for each of the domains (business, application, data, technology) as well as perform a **gap analysis**. (see <http://pubs.opengroup.org/architecture/togaf9-doc/arch/chap27.html>)

For the *target architecture* models management asks you to demonstrate the relationship between the stakeholders, the business goals and the relation to the architectural elements realizing this.

Management asks you to identify the stakeholders, their goals, provide an analysis of the goals and identify the business requirements that lead to the target architecture.

For this assignment use the recommended subset of the motivation extension of ArchiMate:

- Stakeholder concept
- Goal concept
- Requirement concept
- Influence relation
- Association relation
- Realization relation

This case might not provide all the information needed for goal refinement. Be creative; identify relevant logical stakeholders yourselves, the same goes for the goals and requirements. We expect at least six stakeholders with refined goals and requirements. Each requirement needs to be implemented by an element from the to be architecture.