Understanding the customer needs in business network: an emerging model in the diagnostic imaging industry

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Abstract

This paper examines the problem of understanding the client for an actor working in the diagnostic imaging industry. This is a context characterized by some marked specificities, such as the high technological level, but even more so the high complexity of customer purchasing processes, which involve buyers as public and private organizations and who see in the role of influencer as well as of decision-makers in the medical community and in general of the scientific community interested in new technologies applied in the medical field.

The paper provide an emerging empirical model produced by business managers in the diagnostic imaging industry and based on the role of relationship with clients and influencers to capture trends in the case of a crowded market with an extended presence of competitors, and characterized by extensive product complexity (regarding technical, application, user typology, scenarios of use, needs and request satisfaction capabilities). Such model, which should be more comprehensively imaged as a full framework constituting and inspiring a cultural shift among the company, has been named "needs roadmap framework". The definition of this needs roadmap and its interfacing of the product roadmap, will be presented and discussed.

The understanding of what is called "needs roadmap" in the company corresponds to an increasing attention to networking with actors in the scientific community and the health system, as well as in the scientific community that oversees the knowledge underlying the technologies used to make the products. The business network therefore includes actors in positions of influencers that become decisive for the relationship with customers and for the timely development of products.

The case presented in the paper and the management model is proposed and discussed in the paper in its theoretical and managerial implications as a specific case of the business network.

Keywords: market trends, market understanding, customer needs, needs roadmap, diagnostic imaging

Introduction

This paper examines the problem of understanding the customer needs for a business in the diagnostic imaging industry. This is a context characterized by some marked specificities, such as the high technological level, but even more the so high complexity of customer purchasing processes, which involve buyers as public and private organizations and who see in the role of decision-makers as well

as influencers in the medical community and in general of the scientific community interested in new technologies applied in the medical field. The specific case of diagnostic ultrasound products will be used as a practical reference for a more general approach. Anyway, similarities and possible applicability can be found also concerning the industrial machinery environment and, in general, in any context where long time frames for product development (three-five years) are coupled with fast changing contexts/needs/trends (approximately one-three years). The general topic of the analysis of market needs and product definition is considered, focusing mainly on the process of collecting, analyzing and defining the "voice of the customer" (Griffin and Hauser, 1993).

The paper has a particular genesis, as evidenced by the presence among the authors of two management representatives of a firm of the diagnostic imaging industry. On the methodological level, this paper adopts a case analysis method (Yin, 2017) based mainly on the participant's observation, according to the involvement of at least two of the three authors (Guercini, 2014). The two authors of corporate affiliation have direct experience in the industry of at least five years in one case and over ten years in the other. The paper therefore makes use of both conceptual categories specific to the IMP group literature (Håkansson et al., 2009; Håkansson & Snehota, 2017) and the language and conceptual categories used in understanding the market in the company and in the industry analyzed in this paper.

From the point of view of the business, the paper focuses on the internal company discussions about the passage from the so called "product portfolio roadmap" (owned by the product marketing) to the "needs roadmap" (owned by the strategic marketing), therefore to develop first the "needs roadmap" (that is, the set of needs, trends and tendencies, that we are willing to satisfy and to "anticipate") followed by the "product roadmap", intended, at its larger extent and meaning, as single product definition and development, evolution and full portfolio definition and evolution over time.

In the next sections, we provide a workflow and model for product, product roadmap (single product evolution), and product portfolio roadmap (product offer development in time and characteristics, "meanings", contents) definition and development in a global diagnostic imaging company.

The buying process in the diagnostic imaging industry

In a B2B multi-interface purchase process such as the one for diagnostic ultrasound systems (within large institutions, clinics or hospitals), many actors are involved in the purchase process: (1) User – the operator of the system; (2) Customer – the final decision maker; (3) Technical/Engineering – analyzes and evaluates the system from a technical, installation, management and service perspective; (4) Finance/Procurement Office – economical and feasibility of the purchase, capital equipment management, purchase, lease/loan/rent/pay-per-use options evaluation, etc.

Therefore, different customer journey touch points (Stein and Ramaseshan, 2016) should be evaluated based on the different actors involved in a sales process. The Buying process for diagnostic ultrasound in Hospitals, Clinics, large Institutions, where more actors are present and active within the Buying Process, may involve everyone listed above (User/Customer/Finance-Procurement office/Technical-Engineering). Similar scenarios can be found in other industrial contexts where the purchase of machinery/Capital equipment is involved. On the other hand, in private practices the buying process is condensed in the interaction with the only "official" actor present: the customer. Analogous cases can be experienced when capital equipment (manufacturing machinery, for instance) are purchased by small single owner production sites (even if today mostly present in some specific compartments and geographies).

An industry overview

Going deeper within the specific case here considered, the following information and considerations are given in order to better shape the context and the network in which the case is set.

The worldwide diagnostic imaging ultrasound market is characterized by 12 large players: GE Healthcare, Philips Healthcare, Canon Medical (previously Toshiba Medical Systems), Siemens Healthineers, Hitachi Medical Systems, Mindray, Fujifilm SonoSite, Samsung, Esaote, BK Analogic, SonoScape, SuperSonic Imagine, plus dozens of other additional manufacturers (where a grand total of 70 can be considered a realistic approximation), some of which target a specific application, product category and/or geography.

According to publications about market study forecasts, Western Europe market shows a general low growth. The traditional ultrasound markets are saturated and hence growth is primarily driven by the replacement of older systems, therefore huge importance is represented by the installed base knowledge and its targeting. What is slightly growing are the new ultrasound applications of "point of care" (POC) where completely new users are entering (Harris, 2018).

Diagnostic ultrasound is an operator and patient dependent examination, where anatomical and hemodynamic analysis settings have to be adjusted in real-time while scanning. Diagnostic ultrasound systems consist of the scanner body, which houses the electronics and can be portable or cart-based, a control panel for system operation, a monitor for the diagnostic image visualization and a set of probes, whose technical and design characteristics are defined by the body area and patient types on which they are used. More and more ultrasound investigations are performed daily worldwide, with productivity being one of the main key drivers for users (Forzoni et al., 2012).

The patient population is represented by fetal, neonatal, pediatrics and adult, while sonographers, medical doctors, radiologists, surgeons, midwives, paramedics and veterinary practitioners populate the user profile, covering the full range from novices to expert users. Due to their wide distribution, ultrasound systems are also used by non-sonographers; therefore, a higher level of ease of use has been urgently requested in recent years. These new paths in the use of ultrasound have completely changed the customer's approach to ultrasound technologies and devices, as well as the market perception of such diagnostic technology, which is the only one in the field of complex diagnostic imaging characterized by a real-time nature (Andreoni et al., 2015).

Representing the "workflow" to detect and analyze the needs in the industry case

In some of the most complex scenarios as well as more complex products/solutions, customers would desire/require a product not only solutions to problems, but also opportunity generation. In case of products whose development lasts many years, a proper plan which should focus on the forecasted needs of the customers, has to be properly structured and then implemented. Such forecast should include also future possible regulatory, legislative, guideline and normative scenarios which may arise during the development as well as commercialization phase of the product/solution. In purchasing processes where more actors are involved (for instance the user, the customer, the technical department, the procurement office), the proposed solution has to consider the needs not only of the user, but also the ones of the other actors: their weight and prioritization have to be considered during the product development, otherwise such solution will never be purchased even if that would be most desirable one for the user.

The methods, techniques and "workflow" implemented to detect and analyze the needs (expressed, unexpressed, not understood; by the customer/user, by the market, marketing, etc.; just touched on/at their embryonal stage) were the following:

- interviews and direct observations to users/customers of the company systems (comprising also the customer survey conducted after product installation and use, as well as the more general post market surveillance process outcomes – especially if considered in a context of continuous improvements, more than regarding adverse events only) to see the real life/world/workflow;
- interviews and direct observations to users/customers of competition products;

- interviews to the possible stakeholders/actors present within the purchase process (indicated as "purchase" and not "sales" process to re-focus, also here, on the customer's point of view) – user, customer, technical-engineering, finance/procurement office;
- interview to non-users of the considered products (neither from the company, nor from competition) in order to have insights on "why-not-used";
- market analysis - market intelligence and experience/network-discussed/weighted information/insights;
- competition analysis (direct/applicative and indirect/technical);
- company performances and history/tendencies analysis (and best/worst case scenarios) using Internal Business Intelligence (B.I.) as well as Customer Relationship Management (CRM) systems;
- overview and review, filtering and analysis of the inputs coming from tenders with tender office/experts/sales managers: technical, performance, service and/or economical-finance needs;
- technical trends/innovation monitoring/state of the art analysis-updates (literature, technical societies, conferences, patents) performed with R&D (networking with technical journals reviews and universities/third party research institutions; update and review/overview of granted programs public);
- application trends/guidelines monitoring, review of the literature, guidelines, conferences, educational events, networking with Key Opinion Leaders (KOLs)-Influencers (especially if involved in writing and reviewing the guidelines – and standards/norms, in a more general context/approach); application journal reviewers, hospital-universities-large clinics/groups;
- interviews and continuous update to company personnel on the field (sales, marketing, application specialists), as well as back office and sales support.

The inputs, trends and tendencies collected in the above list were placed comprehensively within a shared structured document and a dedicated explanatory presentation summarizing and graphically representing the current situation, the expected future scenario, the targets per application in terms of performances and tools, and the actions planned or needed to fill the gaps over time.

All the purchase projects-related actors were involved since the beginning of the needs roadmap definition, whose outputs will be then differently weighted and consequently prioritized, depending on the Company plans as well as capabilities, characteristics, product/solution positioning and marketing mix.

The above listed interviews (and, more in general, the whole needs Roadmap analysis and definition process) were not performed solely once but it has to be intended as a continuous update, delivered via a review-based approach, where the material is updated at particular planned time lines, while the needs roadmap is re-analyzed and re-shaped.

Nevertheless, the definition of the "needs roadmap" and its continuous update is the main pillar represented by the outputs of the strategic marketing process, representing its most important Strategic activity, just below and deriving from the "company vision" and the related "company strategy".

The Needs Roadmap was achieved (and updated, on a Revision-based approach) with interviews to customers and non-customer, KOLs – "Influencers", Market and Competition analysis, technical and application state of the art and tendencies analysis, as well as interviews to people on the field (Sales, Marketing, Application Specialists – where, the latter, are technical-application experts, dealing with the demonstration phase, commonly done for the evaluation of a capital equipment). The outcome was the "needs, trends and tendencies" roadmap (more commonly indicated as "needs roadmap"), which originates and sustains the product roadmap (Figure 1): needs tracing the path for solutions. With such "path" considering, and to be considered, for the different actors who will populate the future purchase process of the product/solution "under development".

Figure 1. The outputs of the Needs Roadmap originate and sustain the Product Roadmap
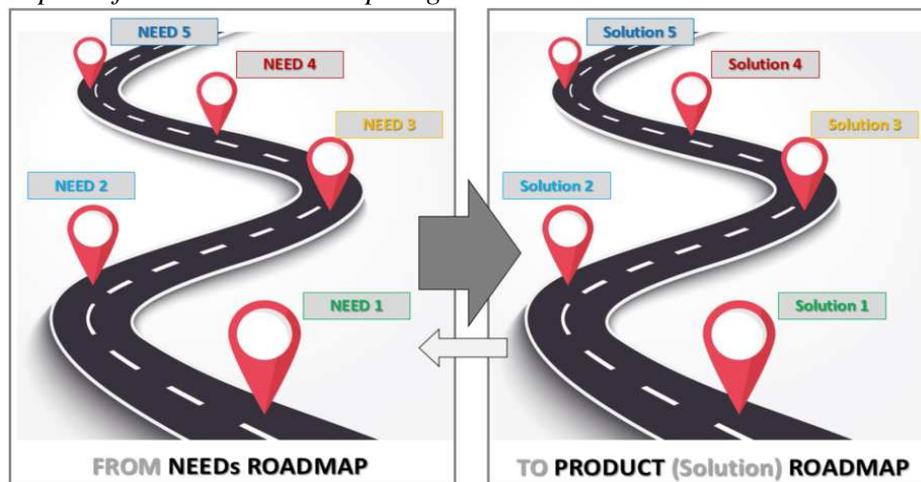
The needs roadmap represents a pillar between and within the company's vision/strategy and the product roadmap. It represents the fundamental basis, as well as the interface from which the inputs are coming and to which the outputs/changes/updates/limitations have to be compared to and re-evaluated. Keeping trace of the different reviews in chronological order was a must, enabling a logical base to show also its evolvement over time, and brought about by changed external/internal scenarios. Such workflow was useful when recapping decisions already made, as well as when having to make decisions/prioritizations in a scenario that is similar to what had already been experienced in the past in a comparable application on a different product segment. Moreover, it was a valuable "historical memory resource" (Figure 2) to be reviewed in case of incomprehension, double checks and/or major review processes.

Findings: the role of interaction and networking in the case analyzed
The paper provides an emerging model produced by business managers in the diagnostic imaging industry and based on the role of relationship with clients and influencers to capture trends in the case of a crowded market with an extended presence of competitors, and characterized by extensive product complexity (regarding technical, application, user typology, scenarios of use, needs and request satisfaction capabilities). Such model, which should be more comprehensively imaged as a full framework constituting and inspiring a cultural shift among the company, has been named "needs roadmap framework". The needs roadmap provided by the strategic marketing included:
- a worldwide scenario summary of the application situation and trends;
- a picture of the company situation today in the different countries;
- a proposed path for the company to grow in terms of sales and branding per application.

The inputs, analysis and outputs of the needs roadmap were constituted by:
- inputs collected - Actions done to understand where we are and where we would like to go:
- worldwide market scenario about the most commercially interesting applications;
- company market presence per application per country;
- company country survey and direct discussions and meetings with local marketing/sales;
- competitors' application presence and activities/tendencies;
- interviews to KOLs or «influencers», sonographers, expert and non-expert US users (WW);
- analysis of application trends WW – short, mid and long term per application;

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- analysis and output - outcomes in terms of proposed needs roadmap;
- where we, the company, were at the time of the needs roadmap definition – company scenario per application – (integrated and supported by a SWOT analysis per application);
- needs roadmap proposal - 3 year view –targeting, positioning, value proposition, marketing-mix & KOLs-"influencers"/projects list per application.

Figure 2. The Needs Roadmap evolves and gets modified over time, as the context changes
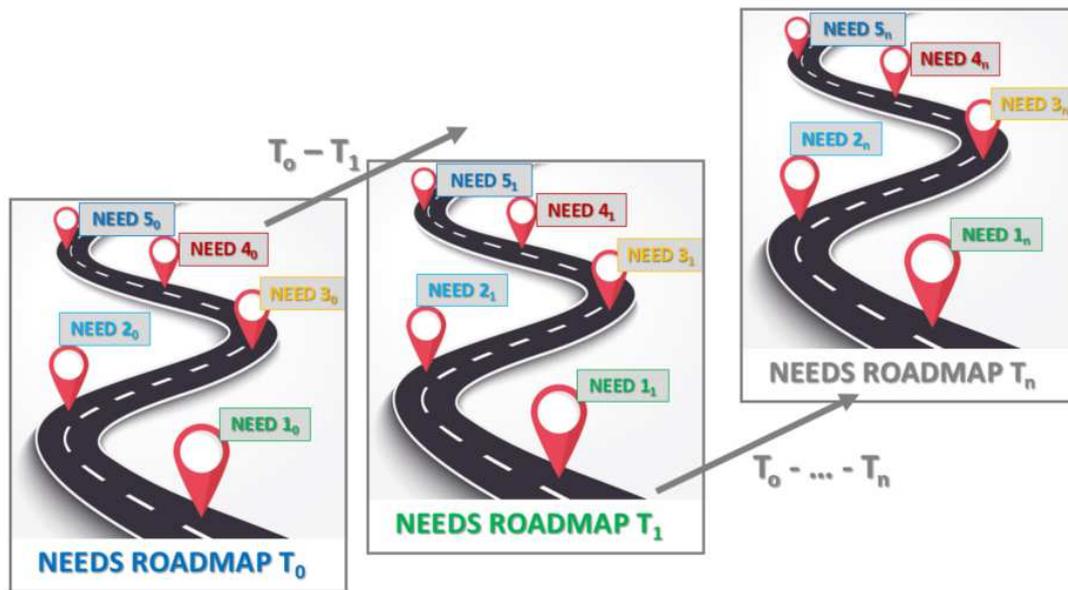
The analysis and outcome of the needs roadmap were structured as a matrix having the topics indicated in Table 1, to be decided and covered, per application. Such table was the summary of the inputs for the product roadmap, comprising the product(s)/solution(s) development and its/their expected development/evolution.

Specific additional topics of the needs roadmap listed here, comprising both additional inputs and outcomes, were: (1) inputs from technical-application scenario (R&D) – to know today what competitors may propose in the near and mid-term future; inputs from application guidelines (application & educational marketing and medical affair) – to know application guidelines active today and what is in discussion/to be active in discussions.

The aim of the "needs roadmap framework" is to provide a workflow and model for product, product roadmap (single product evolution), and product portfolio roadmap (product offer development in time and characteristics, meanings, contents), definition and development. In the case analyzed, a shift from having the focus on the "product roadmap" (engineering/traditional industrial approach) to the one of focusing on the "needs roadmap" (relational/emerging business network oriented) emerges as a main trends in the business market approach.

Table 1. Outcome Matrix of the Needs Roadmap

| 1. Application needs 2. Positioning 3. Product 4. Promotion 5. KOLs (project/ status) 6. Targeting 7. Price 8. Point of Sales	**X**	1. Application 1 2. Application 2 3. … 4. … 5. … 6. … 7. … 8. … 9. … 10. Application n

The needs roadmap is a living document with a 3 to 5-year coverage/plan consisting in the definition and prioritization by relevancy and importance of inputs. The updates, changes, "reductions-discounts", re-working (if any) performed on the product roadmap (and its contents) must always be evaluated and re-evaluated in light of the analysis performed on the needs roadmap.

An additional plus of the Needs Roadmap Method is that the "reason why" of any action is always stated, thus "naturally" enabling an engaged and self-propelling attitude: knowing "why" the related and following needed activities are better understood and therefore performed in a (possibly) better way.

The needs roadmap has to be at the basis of the (strategic and tactical) evaluation process for the product/solution/"bundling" roadmap. Strategic marketing is the driver of the flow/method of the Needs Roadmap, followed by product marketing (which "owns" the product road-map). This method also enables other functions (R&D, medical affair, sales support, tender office, etc.) to update themselves, therefore to have a self-propelling attitude for innovation/networking/collaborations, devoted to a better delivery as a consequence of a better scenario and understanding (or even perception) of the "reason why" (an action is done, a work is required, etc.) at different levels and from different viewpoints.

The strategic marketing is the group that has to define both the strategy as well as the contents, education and messages that have to be delivered once the product/solution will be proposed to the market. Such double line connection between what stands before the product definition, design, production and launch, and what stands after the product realization, constituting its launch and support, represents the mid to long term company strategy implementation. This ensures a link between the needs roadmap and what will be delivered on the market, both at the time of the related product/solution launch, as well as, in order to "prepare" the company, product/solution and the brand (at its broader meaning) for the future path planned by the needs roadmap and (possibly) forecasted as well as updated over time. Moreover, such dual and ambivalent approach ensures to avoid mismatching between the advertising and marketing communication activities and contents, with respect to the real value/benefits/meanings/contents of the product/solution delivered.

Figure 3. Schematic view of the main characteristics, contents and interactions between the Needs Roadmap and the Product Roadmap
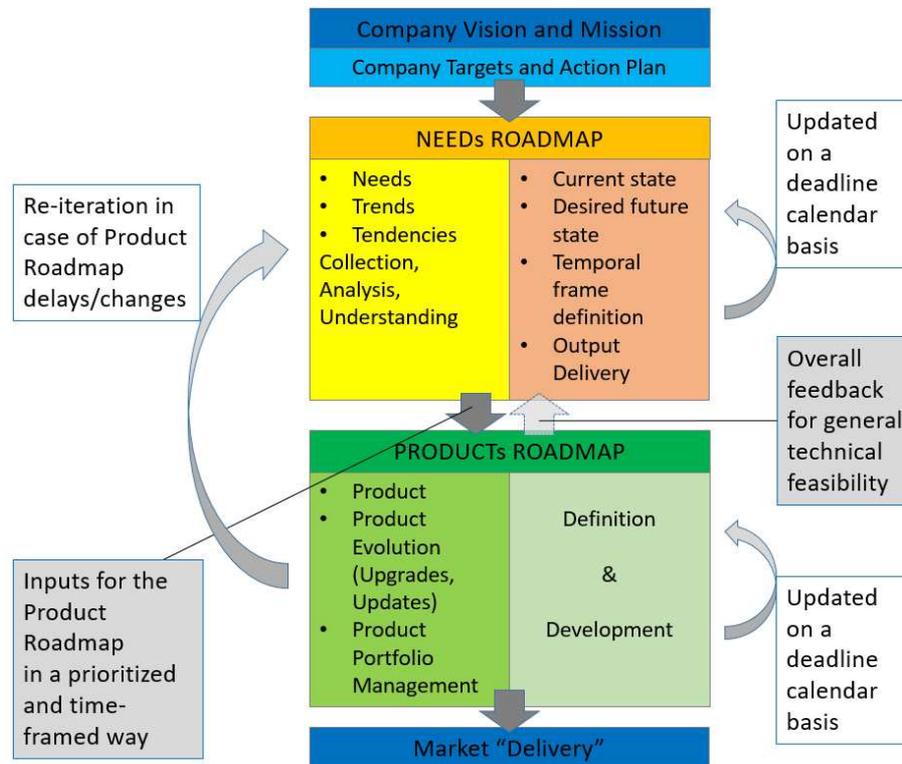
Strategic Marketing owns the needs roadmap because its interface and view point is towards the outer world, while the product marketing has to be focused towards R&D and strictly product-related aspects. This is due to the improved efficiency and better time/effort/resources organization gathered by the fact of having clear focus and interfaces, as well as knowing where the sight has to be directed

Such organization and clear scope division has to be parallel with a clear duties and activities definition which, apart for an always constructive discussion, interaction and possible co-activities, has to be separated on the aspects of decision making, ownership and responsibility.

The "bundling" mentioned above is considering the cases of a meaning shift (even if, specifically referring to the diagnostic ultrasound market, the compartment is experiencing a fast shift from a "pure" B2B to a more B2C-price oriented market, at least for the mid-low end and portable segments) to a bundling offer constituted by the product, the related knowledge transfer and training, which can be presented together, the technical service contract accompanying the proposal, as well as the leasing contract completing the scenario.

The method here described avoids also short timeframe-only driven decisions and implementations, as it forces a longer time frame "horizon" when planning the company's short, mid and long temporal horizon Market delivery and scenarios.

Conclusions

The understanding of what is called "needs roadmap" in the company corresponds to an increasing attention to networking with actors in the scientific community and the health system, as well as in the scientific community that oversees the knowledge underlying the technologies used to make the

products. The business network therefore includes actors in positions of influencers that become decisive for the relationship with customers and for the timely development of products.

A specific input weighting model and process in order to transform the needs roadmap inputs coming from the different actors, as well as the "on the side" conditions of market, competition, company characteristics and aims needs to be described in a future paper where a multi-factorial bi-dimensional weighting space (Andreoni et al. 2016) will be created for all the 4 "classic" figures/actors of a complex purchase process (user, customer, procurement office, technical office), in order to understand, analyze, evaluate, prioritize and implement, the needs, trends and tendencies of each of them.

That is to say, to find, instead of the optimal point of a two-dimensional "graphic module", the "optimal path" that allows the best "compromise" between requests, times, costs and project boundaries, in a multidimensional space.

The needs roadmap, therefore, sustains and helps defining the product roadmap: from meanings to solutions representing value for all the actors populating the purchase process, and not from the production of solutions and then to meaning-finding for promotion and sales, towards the different actors involved in the purchase process.

The the management model presented in this paper has been proposed and discussed in its theoretical and managerial implications as a specific case of the business network. Additional and consequent papers will follow, with a drill down approach to the aspects of product marketing and product design, in order to fully shape the chain steps and contents from the needs roadmap definition up to the product/solution development and its market proposition and delivery.

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