Customer-oriented products and services – Classification, discussion of traditional concepts and suggestion of an internet-based business model

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Abstract

The growing focus on customer relationship forces enterprises to redesign their processes more customer oriented. This article suggests a classification of customer orientation from the customer's perspective. Within this classification we discuss processes to obtain customer-oriented products and services in enterprises. To create a comprehensive solution to a customer's problem, i.e. a bundle of customized products and/or services, we present an internet business model. It uses the internet technology to realize value chain and supply chain activities between different actors and an intermediary who coordinates the network.

Methodology

Customer orientation is a central theme in literature. Nevertheless it gives the impression that comprehensive and individual customer's needs are not covered. Normally the customer receives individual products and services which are not integrated. At this point we ask specifically how these customer needs can be handled. We answer the question by focusing the possibilities of internet based markets and internet-driven virtual value chains. First of all we define parameters to measure the customer orientation from the perspective of the customer. Existing parameters discussed in the literature only focus the perspective of the seller. In a second step we transfer the parameters in a matrix which helps us to classify the customer orientation. Based on this matrix we discuss suitable production concepts to supply the range of customer-oriented products and services. As a result we note that the traditional crafted customization can not produce self allocatable individual and complex outputs, i.e. an integrated bundle of customized products and/or services to satisfy a comprehensive and individual need. We present an internet business model to create an adequate solution. This business model uses the internet technology to realize value chain and supply chain activities between different actors and an intermediary who coordinates the network. Finally we discuss a broker-based model of mass customization in the internet concerning its ability to produce a customer-driven output.

Classification of customer orientation

Many of the so called seller markets are changing to buyer markets. This leads to an enhancement of customer-centered activities on production-oriented markets. As a result there is a demand for everyday products and services as well as for individualized benefits on consumer goods and supplies.

In order to classify the spectrum of customer-oriented products and services it is necessary to define appropriate parameters [cf. Lampel and Mintzberg (1996), p. 21]. Reichwald and Dietel describe customer orientation issues focusing on production. They differentiate the complexity and the variability of tasks in the production program. [cf. Reichwald and Dietel (1991), p. 405] Pine et al. use the alteration rate of products and processes to distinguish between standardized and customized products. [cf. Pine et al. (1993), p. 108-110, 116-117] However, the success in customer orientation will be granted in adaptation of customer's needs to products and/or services (in the following abbreviated with the term output). Therefore it is important to measure the personalization from the view of the customers [cf. Picot (1991), p. 353-354]. At this point we need parameters which describe the customer's felt adaptation.

A suitable parameter is the degree of individuality. It describes the orientation of the output to a customer's individual need according to his personal situation. The individuality arises with the individual content or value of an output. The relation between the individuality of an output and customer's need depicts only a single feature of an output because different features can have different levels of individuality. Furthermore, a customer would like to look on various features in order to find a personalized product or service [cf. Lancaster (1971)]. The features describe all parts (e.g. product attributes, price, colour) of the output which make a difference to a customer. In this context an additional parameter has to be established: the degree of complexity. Complexity depicts the output from a multilayered basis. It describes the variety of different features of an output. Figure 1 shows the relations between the customer's need, output, feature and value.

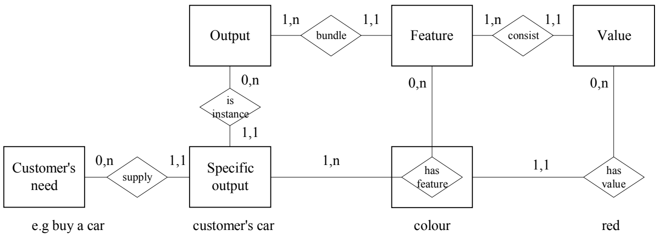

Figure 1:Relation between customer's need, output, feature and value

As a result we note that a customer's focus can be described with the felt individuality and complexity of the output. Picot and Maier use the term "specificity" to describe the customer orientation of the output. It increases with the decrease of the alternative usage of the resource. [cf. Picot and Maier (1993), p. 9]

Furthermore it is possible to break down the parameters by a granular gradation. First of all we will view the parameter individuality. It depicts the number of allocatable values of one feature:

- No individuality: the value of a feature is fixed and can not be changed (e.g. one unchangeable colour of a car).
- Limited individuality: the value of a feature can be chosen from a pre-defined selection which offers more than one values (e.g. 5 colours are selectable).
- High individuality: the product is unique, there are no restrictions for the specification of the value (e.g. self allocatable colour).

The complexity describes the number of allocatable features of the output. A break down of the parameter complexity will look like this:

- No complexity: no feature can be chosen (e.g. interior, engine and colour of a car are not assignable).
- Limited complexity: the features can be chosen from a pre-defined selection which offers more than zero features (e.g. mutual dependent specification of colour and interior).
- High complexity: there are no restrictions for the design of features. The customer can determine the features (e.g. the construction of the car can be designed).

We are now able to transfer the parameters and the granular gradation in a matrix. Doing this, we give some examples of products and services (cf. figure 2).

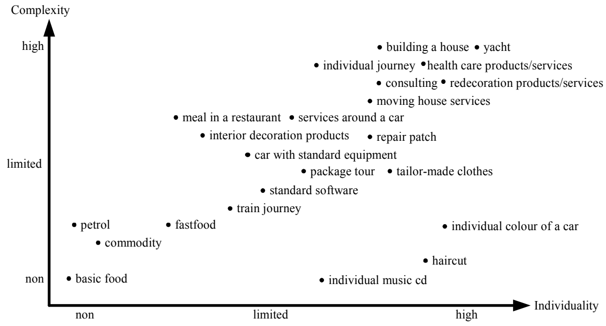

Figure 2: Parameters individuality and complexity of customer-oriented outputs from a customer's perspective

Furthermore we differentiate between three classes of outputs to classify the different degrees of individuality and complexity [Based on: Langlinais and deLeon (1999)]. These classes focus on the releasing moment of manufacturing which can be customer-driven and/or seller-driven:

- Seller-driven output: it is manufactured and standardized independently from individual customer's need. The production process is seller-driven.
- Customer-centric output: it offers a number of pre-defined options. The customer can customize the output within these options. The production process is both seller and customer-driven.
- Customer-driven output: it allows the customer an individual design of the product and service. The production process is customer-driven.

See figure 3 for a compiled classification of personalized outputs in the perspective of the customer. We are now able to measure the felt adaptation in three classes of outputs by the parameters individuality and complexity.

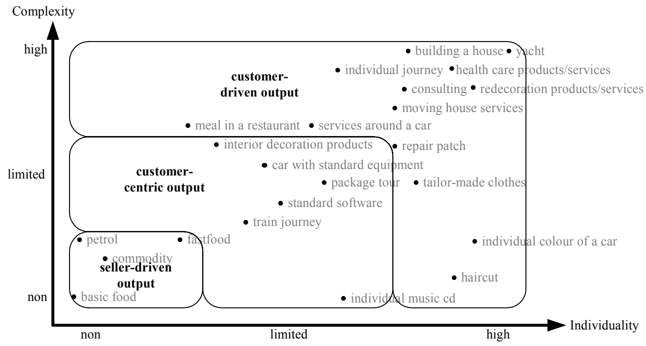

Figure 3: Classification of customer-oriented outputs from a customer's perspective

Organizational implementation of customer orientation

The question arises how enterprises can realize the customer orientation. We try to answer this question by considering the classes of the classification and the parameters (cf. chapter 2) as input factors for the Contingency Theory [cf. Kieser (1999), p. 171-176]. These factors influence the business processes and the organizational structure. As a result we are able to define suitable production concepts (cf. figure 4).

The *seller-driven output* can be completely controlled by the seller and is manufactured independently from the customer's needs. The processes and the organizational structures can be designed in a seller-driven environment. The model of mass production can realize the seller-driven output. It leads to standardized outputs concerning design and distribution [cf. Lampel and Mintzberg (1996), p. 21-22]. Mass production pursues the principle of Henry Ford: "You can have any color car you want as long as it's black" [Pine (1993), p. 7]. The production of variants can also be used to realize seller-driven outputs with limited personalization. Here the customer gets products or services in different variations of features which are set by the manufacturer and cover average individual needs. Each variation is made for a small group of customers. This can lead to a high number of variants which won't fit exactly the customer's needs. [cf. Piller (1998), p. 876; Piller (2001), p. 175-176, 184]

A *customer-centric output* will be realized in a process which is customer and seller oriented. At the beginning of the value chain the business processes and the organizational structure are driven by the interests of the manufacturer. This changes at the order penetration point, also called freeze point. At this point the seller integrates the customer's specification in the production process. In general the specifications of the customer are integrated as late as possible [cf. Wildemann (1995), p. 249-256]. „Value chain customization begins with the downstream activities, closest to the marketplace, and may then spread upstream. Standardization, in contrast, begins upstream, with fundamental design, and then progressively embraces fabrication, assembly, and distribution" [Lampel and Mintzberg (1996), p. 25]. Starting at the order penetration point, the output will be adapted within a range of pre-defined options (i.e. values and features) to fit customer's needs. Another way of customer orientation is to extend the standardized product or service with additional value-adding services. [cf. Pine (1993), p. 171; Cleland and Bruno (1997), p. 23] The concept of mass customization can be used to implement the customer-centric manufacturing of outputs "with enough variety and customization that nearly everyone finds exactly what they want" [Pine (1993), p. 44]. Finally, mass customization offers the customer a number of pre-defined values. They can be used to define the also pre-defined features of the output [cf. Piller (1998), p. 879; Piller (2001), p. 207]. Individuality can also be created with additional services, a specific degree of delivery service and a kind of product image. Decisively the customer chooses the options which are relevant for his satisfaction. The resulting complexity for the manufacturer can be reduced by the mass production of modular outputs, new concepts of production, usage of information technology, supply networks and additional points of order penetration. [cf. Pine (1993), p. 47, 171; Piller (2001), p. 207-209 ; Piller (1999), p. 4-8; Piller (1998), p. 878]

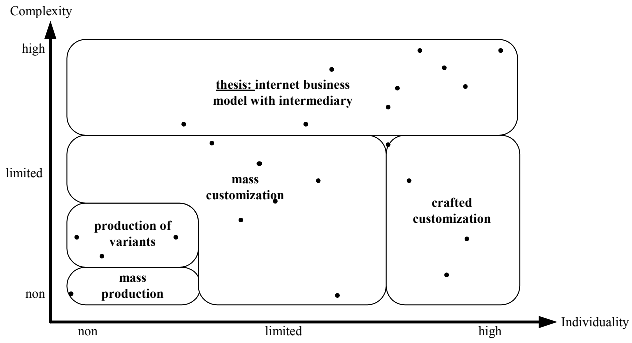

Figure 4: Organizational realization of customized outputs

A *customer-driven output* will be realized with the degree of individuality and/or complexity determined by the customer. The organizational structure must be designed order specific to combine required resources and functions. The trigger of all activities is the customer's order. As a rule there is a relation between high complexity in the direction of individuality. If an output has a high complexity in the view of the customer it is usually seen as an individual output. Therefore it consists of a bundle of individual parts. Necessarily the customer-driven output with a high individuality has to be manufactured in a crafted customization (also called single item production or engineer-to-order production). It realizes an assignable degree of individuality which can't be offered by standardized outputs, variants or pre-defined options [cf. Reichwald and Dietel (1991), p. 406; Piller (2001), p. 184-185]. The crafted customization uses order-specific processes to realize individual outputs [cf. Reichwald and Dietel (1991), p. 406, 436]. Picot emphasizes that a high degree of vertical integration (e.g. one enterprise which realizes all activities in the value chain) is necessary to produce outputs with a high specificity, strategic relevance, uncertainty and frequency [cf. Picot (1991), p. 345-347]. As a result the crafted customization is used by a single or a cooperation of few enterprises [cf. Picot (1991), p. 340, 348-349]. A problem arises if the output is both individual and complex like the customer-driven output (see figure 4 in the top-right corner). The intra-organizational crafted customization is able to produce individual parts but has not enough resources to realize the required complexity of both individual and complex outputs. The additional high complexity of individual outputs can not be covered by the provided resources of a small number of enterprises (we assume a relationship between the complexity of the output and the required resources of the enterprise). Picot indicates that high vertical integration can not be realized if relevant resources are not covered by a single enterprise. In this case he suggest a cooperation of enterprises. [cf. Picot (1991), p. 347-348, 353]

Hence we suggest an internet-based business model. It uses the internet technology to realize the value and supply chain activities between different actors in an inter-organizational crafted customization. The usage of the internet allows the cooperation of a high number of enterprises with low transaction costs. As a result we are able to manage the complexity which is necessary to produce a comprehensive output.

Internet business model to create a customer-driven output

In order to implement a customer-driven output with customer allocatable individuality and complexity, we present an internet business model. It uses an intermediary to bundle resources and the internet technology to support respectively to realize its relationships of value chain and supply chain. The internet technology is decisive to achieve an inter-organizational crafted customization with low transaction costs and cooperation of a high number of specialists.

In the age of e-business, value creating networks based on the internet are called internet business models [cf. Rayport (1999); Timmers (1998); Rappa (2001)]. Hagel III uses the term economic web and describes "clusters of companies that collaborate on a particular technology" in order to "deliver independent elements of an overall value proposition that grows stronger as more companies join." [Hagel III (1996), S. 71, 72] Timmers describes the internet business model as „an architecture for the product, service and information flows, including a description of the various business actors and their roles; and a description of the potential benefits for the various business actors; and a description of the sources of revenues" [Timmers (1998), p. 4]. A similar definition is given by Rappa: „The business model spells-out how a company makes money by specifying where it is positioned in the value chain" [Rappa (2001)]. The base of value and supply chain relationships is the internet technology and its services [cf. Österle (2000), p. 36-40; Rayport (1999)].

Internet business models emerge from virtual structures in the corporations [cf. Byrne et al. (1993), p. 36-38; Alt et al. (2000), p. 101-102]. They implement loosely and partly connected value chain and supply chain relationships based on internet technology. The transition from the virtual corporation to the internet business model is the result of the additional organizational and technical design of the chains between the actors [cf. Hagel III (1996), S. 72]. The internet business models consist of different actors which sum up their resources. According to the common classification they can be divided in: companies, employees, public administration, and customers. Because of the intermediation on internet based markets [cf. Sarkar et al. (1995)] it seems to be necessary to extend this classification with the class of an intermediary [see also: Österle (2000), p. 39]. The relations between the actors can be classified in product and service flows, information flows and financial flows [cf. Alt et al. (2001), p. 6]. While materially products and services imply physical exchange relations, digitalized exchange relations, like digital products and services, financial transactions and information itself, can be handled by the internet. The actors cooperate in their supply and value chain relationships with internet technology. This internet based communication model is called „business bus" [Österle (2000), p. 37] or "it-platform" [Alt et al. (2000), p. 102]. It contains the „totality of technical, applications and business standards on which software solutions, electronic services, etc. are based. [...] The business bus produces the m:n capability of Business Networking" [Österle (2000), p. 39]. This is the basis of the relations between the actors and the exchange of information, finances, digital products and services [cf. Alt et al. (2001), p. 6]. Furthermore the physical flows of products and services are closely connected with the digital ones.

Based on the characteristics of internet business models we create a specific business model for realizing a customer-driven output with a high individuality and complexity. The customer-driven output requires an unique assignable bundle of individual products and/or services. First of all unique individuality can be realized in a crafted customization or maybe in a mass customization with a huge number of pre-defined options and an early order penetration point. In our model various parts with individual features will be produced by independent companies and even by public administration. These actors get their orders from an intermediary and are coordinated by him. Being aware of mutual dependent specifications, the intermediary bundles the different parts and creates a complex output.

This output fits exactly to the customer's needs and his expectations concerning individuality and complexity. The internet technology is necessary to realize the suggested business model. It enables the inter-organizational cooperation with a high number of actors and low transaction costs. Furthermore the internet technology and its services are decisive to handle the individuality and complexity of the customer-driven output. To adapt the needs into the features and values of the output, the business model needs multimedia and interchangeable techniques. They help the customer to explain his needs, the intermediary to understand them and to adapt the needs into feature specifications and the suppliers (companies, employees and public administrations) to produce the required intermediate products and services. Within this supply chain it is important that all activities can be simultaneously planed and managed. Therefore it is decisive that the connection of suppliers and intermediary is straight forward. Systems for supply chain management can work on top of this interconnection. It is also important to interconnect the information systems of each actor. Thereby the internet technology can be used to realize business objects and an inter-organizational data interchange.

Figure 5 shows the structure of the internet business model to implement the customer-driven output. All digitalized exchange relations between the actors can be realized by using the internet technology. To be part of this virtual value chain [cf. Rayport and Sviokla (1996)] each actor needs access to the internet (thin arrow). Necessary physical products and services have to be handled in a physical environment and in 1:1 relationships (thick arrow). In our business model a customer has a comprehensive and individual need (e.g. buy a car) and looks up for a bundle of products and/or services (e.g. information, selection, financing, insurance, purchase, admission and maintenance) to be satisfied [Example from: Österle (2000), p. 46].

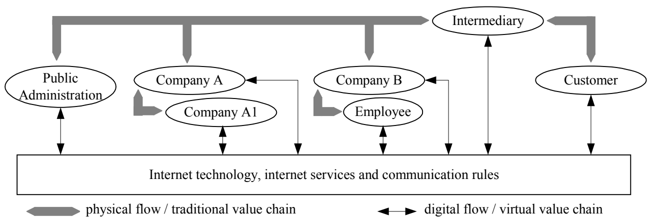

Figure 5: Internet business model to create the customer-driven output

The customer may coordinate his satisfaction by himself. Furthermore he would need the appropriate knowledge to search, evaluate, select, check and bundle single offered products and services [cf. Fey et al. (2000), p. 262; Bakos (1997), p. 1678-1686]. Because of the complexity of these tasks he transfers them to an intermediary. The intermediary acquires the customer's need and initiates an order-specific value chain. He coordinates different actors in supply chain and bundles their resources and intermediate products and services to a customer individual and complex output. Alt et al. describe him as an aggregator and integrator [cf. Alt et al. (2001), p. 10-11]. After releasing the output (e.g. a bundle of products and services concerning the car), the temporarily established cooperation disbands. The actors can re-cooperated for further customer orders in various roles.

With the presented internet business model we can realize an order-specific value creation network. Various companies create individual intermediate products and services. The intermediary coordinates the activities within the supply chain and bundles the intermediate outputs to a customer-driven output. The customer feels no limited adaptation because he is the trigger of all activities. By using the internet technology it is possible to create a virtual value chain which allows an inter-organizational crafted customization and the intermediate bundling with low transaction costs. As a result we are able to manage the complexity which is necessary to produce a comprehensive output.

Customer-driven output based on custom mass production

Elofson and Robinson suggest a "framework for allowing buyers to act as a collective over the World-Wide Web and engage suppliers to produce customer products in large quantities" [Elofson and Robinson (1998), p. 58]. Instead of the supplier-driven mass customization, the authors present an architecture for custom mass production which is buyer-driven. The model consists of an electronic broker in the internet which identifies different buyers with similar interests in a product and/or service. Using methods of collaborative filtering a self-generated market niche arises. Furthermore the broker provides an automated negotiation between the buyers to agree on a set of specific characteristics of the output. The output description is put out to suppliers for bidding. Finally the broker negotiates between various suppliers and orders the output if the buyers and suppliers agree. [cf. Elofson and Robinson (1998), p. 58-59; Robinson and Elofson (2000), p. 2]

The advantages of the supplier in the suggested model include higher economies of scale because of the homogeneous mass production and reduced complexity of the outputs. On the other side the buyers are able to set the characteristics of the output from the ground up. As a result it is possible to produce individual and complex outputs within this model. A problem occurs if the buyers have different requirements concerning the output. Then the specifications are less individual and complex or some buyers quit which leads to lower economies of scale. Furthermore the broker does not coordinate the value and supply chain. But this is necessary to bundle increasingly complex outputs and to keep aware mutual dependent specifications. The model of Elofson and Robinson can be used to produce customer-driven outputs which include the same feeling of individuality and complexity in a collective of customers. If the buyers require a different set of individuality and complexity we suggest the presented internet business model.

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