

# Creating Loyalty in E-Commerce Using Agent Technology

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**Abstract.** The EU MAPPA Project (EP28831) seeks to create loyalty: in electronic commerce by using Agent technology. To create loyalty, it is necessary to understand the potential value of a customer's I<sup>2</sup>P<sup>2</sup>R<sup>2</sup>, that is the value of information, interaction, personalization, privacy, (mutual) respect and re-use. In this paper, we analyse the situation in conventional retailing, give guidelines on transferring the value to electronic commerce, and then discuss how the value is realised in the MAPPA system architecture and/or its agents. Our key finding is that personalization provided by intelligent agents adds value and, over time, should increase loyalty. In this way, a retail organization can leverage the existing loyalty of its current customer base and transfer it to the electronic domain, and by using personal agents increase that loyalty and so maintain market share.

## 1. Introduction

The rapid increase in e-commerce, which has resulted in both increased business opportunities and increased competition, has entailed a fundamental re-assessment of conventional retailing. Many organisations have recognised that customer loyalty is the key to creating and maintaining market share, but loyalty in electronic environments is created by adding real value, which the plethora of card-based loyalty schemes have not fully achieved.

The EU Esprit MAPPA Project (EP28831) anticipates in-store, kiosk-based, internet-enabled, multimedia information systems becoming commonplace in retail premises and home shopping. These systems can, create customer loyalty by adding value, if they are used and presented in the appropriate ways. We refer to loyalty, here, as being the perception of loyalty by which customers are encouraged to return to an electronic-based retail system and/or the store. Potentially, continuous return of loyal customers may lead to increased sales.

The way MAPPA systems are used and presented has been determined by examining existing techniques in Customer-Relationship Management (CRM). By understanding the value of properties such as information, interaction, personalisation, privacy, (mutual) respect and re-use in creating customer loyalty in CRM [9], we can see how this value can be transferred to electronic commerce. In particular, we identify personal agents and multi-agent systems as the technology for realising this transfer of value. The MAPPA application uses Smart Card ownership, Quality of Service adaptation to individualised criteria and requirements, visual animated Personalised Sales Assistants, adaptive interaction and presentation, loyalty points and bonus schemes to engender the proposed loyalty.

In the rest of this paper, we analyse the current situation in conventional retailing, give guidelines on transferring the value to electronic commerce, and then discuss how the value is

realised in the MAPPA system architecture and/or its agents. In particular, the personalisation provided by intelligent agents adds value and, over time, increases loyalty. A retail outlet can leverage the existing loyalty of its current customer base and transfer it to the electronic domain, and by using personal agents increase that loyalty and so maintain market share.

## 2. The Value of Information

In realising the value of information in creating loyalty, we encounter directly what we call the ‘information Catch-22’, whereby we observe that:

- users will only establish user profiles at sites which have already gathered their loyalty;
- loyalty can be gathered by adjusting offers consistent with purchase history; *but*
- individual purchase history can only be established and maintained if associated with a user profile.

To square this particular circle, our recommended action is to capitalise on the retailer’s brand name and leverage the loyalty of the existing customer base. This has to be transferred to the electronic system or site. This can be achieved by maintaining both a consistent look and feel, by which we mean that the multimedia presentation should faithfully reflect the real world image of the retailer, and a distinctive look and feel, by which we mean the operation of the system should be oriented towards shopping in the particular store (compare the WWW pages of the search engines Google and Altavista). Therefore the multimedia system should not be perceived as just another sales and marketing tool, and the lesson learned from popular web sites should be applied: that loyalty is enhanced if the site becomes more valuable to the user at each visit, and no visit should be used as an excuse for a (probably unwanted) sales pitch.

The value of information is realised in MAPPA by a component-based architecture that allows plug-and-play of the presentation layer (see Figure 1).

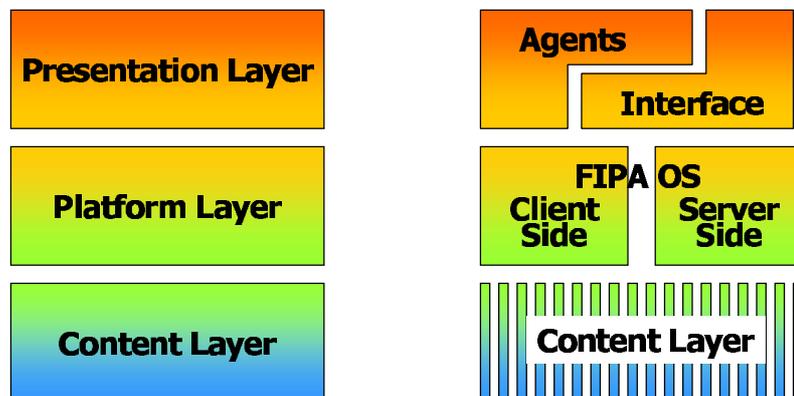


Figure 1: Component-based Architecture for MAPPA System

In most multimedia or hypermedia systems, the logical system architecture comprises essentially 3 layers: the presentation layer, the platform layer, and the content layer, where the physical data is stored. In MAPPA, the presentation layer is broken into two: an agents layer and an interface layer. The agent abstraction here provides interoperability with different interfaces, so that different organisations can develop customised, purpose-built multi-media presentations which properly reflect the company, and use them as part of a MAPPA system.

In fact the separation of layers in the logical architecture occurs ‘further down’ as well. The platform layer, which is based on Nortel Network’s standards compliant open source agent-

oriented middleware system FIPA-OS, allows either client-side or server side processing of multimedia content, and indeed, because of the distribution that agent systems bring, content itself can be widely distributed in any number of thin 'slices'. In addition, the use of agents in the presentation layer brings other ways of adding value, as discussed later.

### 3. The Value of Interaction

The interaction that concerns us here is the business-to-consumer (b2c) interaction involved in retail. Here, loyalty is created by human-human interaction and the 'personal touch'. The question then is how to reproduce that kind of service online in e-commerce? Everyone remembers personal service or a knowledgeable shop assistant, and such intelligence and individuality (one-to-one treatment) implies that the multimedia interface could benefit from some kind of similar personality and sensitivity.

However, this benefit will only be realised if it is predicated on good HCI (Human-Computer Interaction). This implies:

- avoid adaptive interfaces, which are unstable and increase uncertainty (but configurable interfaces with optional features are required to satisfy a wide range of users)
- avoid 'reactive intelligence', e.g. Microsoft's paperclip, which is intrusive, takes initiative away from the user, and cannot back up its interruption (but just as WIMP interfaces were an improvement over command-line interfaces because of the ease of recognition over recall, we want to intelligent interfaces which can remind users of functionality);
- avoid cues for social responses [6], which can raise undue expectations (but human elements are reassuring when dealing with un-user-friendly new digital technology).

The value of interaction can be realised if it remembered that the interaction should create value, not exchange value. In particular, a loyalty scheme is not a discount scheme. Existing "loyalty" card based schemes result only in an exchange of value: some meagre "reward" points in exchange for purchase information which is used in data mining. This exchange does not engender loyalty: most people are prepared to exchange information about their shopping habits and/or preferences in return for a discount but shop elsewhere if the opportunity arises.

To create value in electronic commerce, it is necessary, we argue, to give the customer a stake in the system, and then to see that stake grow or become better in some way. In particular, we want to exploit people's attachments to objects, as identified by Reeves and Nass [6], and also the increased trend towards the software ownership model, whereby users no longer own their hardware and take out a licence to run someone else's software, but instead own their software and have a licence to run it on someone else's hardware [5]

The value of interaction is realised in MAPPa by the implementation of agents with character, which is stored on a WID (Wireless Information Device, e.g. a smart card). The user is then in control: the agent is a highly intelligent, highly competent character that is essentially a slave. The character adds the personal touch to the interface, but importantly increases in competence over time, thus increasing its intrinsic value to a single user (i.e. its owner). This also exploits the user's attachment to objects: s/he owns the smart card *and* its contents (witness to the strength of this attachment - to a gadget and an electronic entity that is 'grown' - can be seen by the crazes for Tamagotchi and Pokemon). The concept is reinforced in MAPPa by the personal agent having the visual representation of a genie: invoking the Aladdin and Lamp metaphor with the user and the smart card, as the agent moves off the WID (the smart card) and occupies (appears as a presence) a position on the screen (see Figure 2).

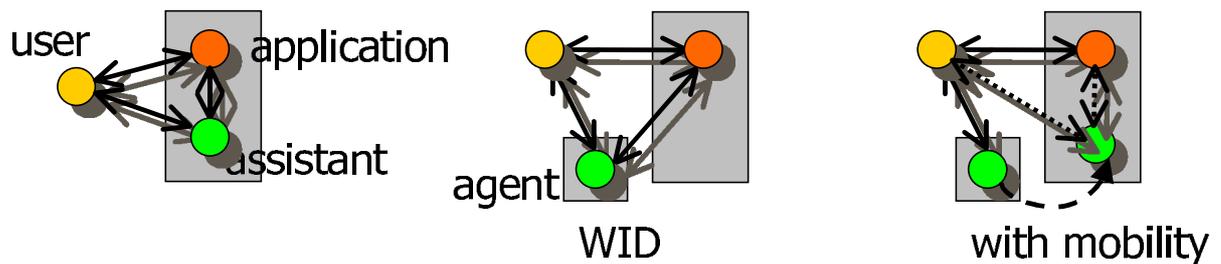


Figure 2: User interacting with an intelligent agent on a WID, and with mobility

#### 4. The Value of Personalization

The key issue in personalisation is: how do I (the retailer) get to know the customer? Or better, How do I (the retailer) find out how the individual wants to be treated (in order to add value by providing this treatment, and so creating loyalty). Of course, personalisation in conventional retailing comes from interaction and the familiarity that follows from that interaction over a period of time. In electronic commerce that direct interaction is lost, but the ability to add value can be realised if the agent (as introduced above) takes care of the customer by personalisation.

The recommended action to realise the value of personalisation is to use the guideline “sense and respond, not make and sell”. Retail organisations have to employ a different marketing mentality in electronic commerce, i.e. they no longer make a product and then seek to sell that product as is, or in order to satisfy any perceived or created demand. Instead, it is important, if the intention is to create loyalty, to detect what the customer wants, and then to customise a product or service so that it fits an individual need. This is what is referred to in the literature of CRM as mass customisation or accelerated 1-1 (one-to-one).

The value of personalisation is being realised in MAPPA by using an Electronic Personal Sales Assistant (ePSA) to reduce the segment size in e-commerce. Teerlink *et al.* [8] describe a general approach to pro-active marketing which aims to satisfy customer needs even before they are really aware of it themselves. One component of their approach is a process of trying to reduce the segment size to as small as one, i.e. the individual. Teerlink *et al.* suggest this can be achieved in a four-step process (see Figure 3).

The role of each step is as follows.

- Step 1: use existing data. In fact already fairly detailed behavioural patterns can be derived from current data;
- Step 2: add external financial, demographic or preference data. This data can provide many extra indicators of lifestyle and individual profile, but in the first instance may need some additional means of capture (possibly non-electronic but as non-invasive as possible).
- Step 3: data captured from the individual at all points of customer contact. As MAPPA is an electronic system, the various techniques for creating loyalty on the web (Nielsen, 1997) can be used, for example regular fresh content, use the smart card for security mechanisms, and gather information by logging (again as unobtrusively as possible).
- Step 4: combine all the above. The fourth step is to combine all this information to create “new” information, by deriving learned traits of the individual. This points to a strong learning component but different for each individual. The logical distribution of responsibility and control afforded by the agent design in MAPPA supports this requirement.

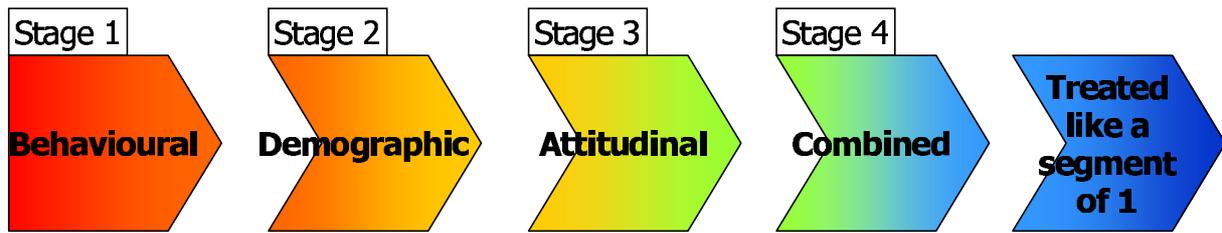


Figure 3: Personalization as a segment of 1

The MAPPA system currently uses existing data and deploys profile agents to acquire additional data. The system is therefore at step 2. Further work will focus on putting the learning components into the MAPPA personal agent in to support step 3 and 4 and move towards the ideal in step 5: treating the individual as a segment of one. In particular, the personalisation that comes from learning (the agent and system adapt to the user's needs and preferences over time) adds value for the user. This should create loyalty, as the system fits the user's needs so well that another competitor cannot offer the same quality of service.

## 5. The Value of Privacy

The issue in privacy is the following: If a retailer goes in for personalisation (as described above) and providing a customised service or product, then how is privacy respected? From the customer's perspective this gives rise to two questions:

- Who do you give what information to, and how often and how long can they use it?
- Who has found out what about you, and how are they using it?

The recommended action to respect a user's (customer's) privacy is to follow the guideline: "remember for, not about" [9]. This means that for each item of information stored about the customer, the retailer should ask itself if the information is being stored for the benefit of the customer or the retailer. If the latter, then the retailer should ask itself if it is worth risking an "invasion" of privacy and so compromising the loyalty it is trying to create.

As well as this guideline, the retailer can try to engage the user by keeping this learned information on the smart card. This is a sign of trust from the retailer to the customer, which can be reinforced if the retailer offers an "information banking" service. The retailer should ensure that it does no more than store the data, but it effectively offers to store value for the customer (i.e. the learning of the agent, any reward points accrued, and so on).

We believe information is a commodity, but, in its electronic form, to maximise its utility it has to be traded not sold, and pushed not pulled. In general, in e-commerce users *will not pay a cent for content*. They will provide user profiles and other data, but will not pay "hard cash" for electronic content. The failure of Slate magazine to pay its way through subscription fees despite the quality of its journalism is indicative of this trend. In this context, the user profile is highly valuable and the customer wants to know that his/her interests are protected.

The value of privacy has not been realised in the MAPPA system at this time, but a possible route has been identified through the implementation of the privacy model developed by Adams and Sasse [2]. In this privacy model, three main privacy factors are identified:

- The information sensitivity: the customer's perception of the sensitivity of information is significant, not the retailer's;
- The information receiver: whether what is known about the user that is potentially invasive, or who knows it;

- The information usage: providing users with the mechanisms for control and feedback.

These factors will define privacy boundaries that, if breached, are likely to cause resentment among users. To avoid a breach, it may be possible to use privacy critics, as defined by Ackerman and Cranor [1], implemented in the personal agent. These critics may be used to interpret the privacy model, and make suggestions (e.g. about releasing a information of a certain level of sensitivity to a certain type on information receiver).

## **6. The Value of (Mutual) Respect**

Reichheld [7] considers the changing face of loyalty over the last 50 years. He points out that 50 years ago, in business and commerce, there was a strong loyalty to organisations and/or other abstractions. This loyalty was often mutual: employees expected to work a lifetime for one organisation, the employer would take care of the employee in retirement. The idea of brand loyalty was also mutual: customers would persist with one product on the expectation of receiving continually consistent quality of service.

In the present day, there is no absolute loyalty in consumers (the whittling away of this loyalty has many contributory explanations that need not concern use here). Loyalty in consumers is now given to whoever provides superior service, and this is contingent upon the creation of value. Loyalty is also shown to one's peer group. Therefore a recommended action for the retailer is to create a “one of us” mindset among the customer base. With personalisation reducing the segment to a size of 1, as described above, the retailer can create a peer-peer relation with the customer. The creation of value cements such a relationship.

A peer-peer relationship can be encouraged by the idea of the situated electronic society. One aspect of this to ensure that events in the e-space have correlates in the real world [4]. In the MAPPa demonstration system, wine retailing, this could be achieved by, for example, wine tasting evenings, formation of a wine club, and so on. Such activities create social cohesion, and encourage loyalty through peer-peer relations.

An additional aspect to consider in creating peer-peer relations is feedback and empowerment. In the MAPPa system this is achieved by providing third party trust and forum agents. These agents enable customers to inquire if recommendations are endorsed by other customers, or to provide feedback themselves (cf. the Amazon.com recommendation system). The social and legal aspects of electronic interactions between agents also need to be considered, and is being investigated in the EU ALFEBIITE project (<http://www.iis.ee.ic.ac.uk/alfebiite>). Ensuring that these interactions are supported by an appropriate legal framework is an important aspect of creating trust in electronic commerce: trusting relations serve also to create loyalty.

## **7. The Value of Re-Use**

The final aspect of creating value is to prevent “card proliferation” by ensuring that the smart card is fit for use in a variety of stores, not just one. The MAPPa system's platform layer, being built on the FIPA standards specifications (<http://www.fipa.org>) supports interoperability between heterogeneously developed systems. Looking further into the future, there are technological developments that need to be considered, for example in display, chip and battery technology, and in network and protocols, so that eventually a single universal access device may be anticipated. This leads to the idea of persistence of context, to provide an

extension to personalised information that maintains the client's current interests and supports off-line information and service gathering, and to develop the functionality to continue to work "off-line", acting proactively or attempting to complete a transaction. This persistence means that a user has an agent identified and working for them, and continuing to work for them whether or not they are on-line. Existing and new interface modalities can ensure that the user may make contact with, or be contacted by, their agent by voice, email, or other means.

From the sales and marketing perspective, retailers should seek to capitalise on these developments by creating opportunistic alliances with other retailers, using standards for profiles and products (internet labels), and using ontologies to create plug and play databases. For example, the MAPPA demonstration system has a second interface for video hire, and can use a separate knowledge base for making recommendations.

## 8. Conclusions

This paper has discussed the problems in creating loyalty in electronic commerce. We argue that in order to achieve loyalty it is necessary to understand the potential value of the customer's I<sup>2</sup>P<sup>2</sup>R<sup>2</sup>: the value of Information, Interaction, Personalisation, Privacy, (mutual) Respect and Re-use. In each case, we have analysed the situation in conventional retailing, given guidelines on transferring the value to electronic commerce, and discussed how the value is realised in the MAPPA system architecture and/or its agents. In particular, personalisation and protection of personal information are seen as the keys to creating loyalty. The MAPPA system is described in more detail in [3]. We plan to develop the user's privacy model and its implementation in an agent, to develop the third party trust agents, and to evaluate the creation of loyalty in user trials. Tool-kits for developing and deploying multi-media presentations, personal agents, and ontologies for particular application domains are also required.

## Acknowledgements

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