

Convergence and trust in eCommerce

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Trust is the key element of commerce, both for traditional models and — more recently — for eCommerce. Unlike its traditional counterpart, eCommerce relies on trust being created and maintained with the help of digital devices and services. Convergence brings significant changes to the way people interact through digital media by offering ubiquitous and seamless communication. This has a significant impact on the way trust is established and maintained, with consequent impact upon eCommerce. This paper identifies a number of the most important challenges to trust in eCommerce as well as trust-related aspects of key enablers of eCommerce. From this perspective, the paper studies an impact of convergence on trust within eCommerce to identify several positive relationships.

1. Introduction

The majority of our social interactions require a certain amount of trust. There are some obvious examples such as patient's trust in a doctor's capability to perform major surgery. There are, however, several smaller examples — trust in the postman to deliver mail, trusting a solicitor to arrange legal matters properly, trusting friends to help us when in need.

Commerce is one of the activities that permeates society — we are almost continuously both buyers and sellers, exchanging goods and services, sometimes for money and sometimes directly. Not surprisingly, trust is an essential element of commerce (see, for example, Böhle et al [1]) — and an essential element of eCommerce also.

People are very experienced in building and maintaining trust — as long they can deal with the other person face to face. People are continuously seeking evidence of trustworthiness [2] to the extent that every statement is thought to be an evidence of trust (or distrust), along with the actual content and embedded relationship.

The main impact of digital communication on commerce is not only the technical enablement of eCommerce, but, at the same time, the necessity to redefine and recreate the social trust (seen also as the social capital and lubricator [3]) that is essential for eCommerce to flourish.

This paper explores the impact that convergence in communications may have on trust in eCommerce. The paper starts with certain definitions and clarifications. Next, using the systematic trust framework, the paper explores trust enablers directly associated with eCommerce to identify potential impact of convergence on trust.

2. Convergence

Convergence is a trend in telecommunications that enables the creation of integrated communications rather than just fixed or mobile connections.

Convergence is an all-encompassing activity that goes beyond mobilising fixed connections and provision of continuous coverage. The development of convergent communications has shifted most recent interest from 'pure' eCommerce into mobility-related eCommerce, or meCommerce. The meCommerce is a convergent e- and m-Commerce where participants can enjoy their activities through the convergent network [4]. In meCommerce, as well as in traditional commerce, the actual user's acceptance is driven by trust more than by anything else. In the absence of trust no commercial transaction will happen, no matter how convenient and sophisticated the underlying technology is. In this paper 'eCommerce' will be inspected from the 'meCommerce' perspective. However, in order to avoid unnecessary terminological problems, the paper will use the term 'eCommerce'.

3. Trust in eCommerce

3.1 Definition of trust

Trust is one of those constructs that escapes a clear and widely accepted definition. Indeed, the construct of trust encompasses 17 different meanings [5]. In the light of this, it is necessary to provide a definition of trust that facilitates the analysis in this paper. The definition below focuses on the relationship between trust and control.

Trust is an evidence-driven increment in subjective confidence that the actions of independent entities will suit our needs, whereas such confidence

cannot be justified by control over such actions or entities.

Trust is therefore an extent of a desire over rational control, subjectively justified by certain evidences. Conversely, if the situation allows for control that can lead to rational confidence, then trust is not needed. Several theories of trust provide alternative or complementary definitions — by exploring trust in a context of beliefs, security and control [6], complexity and usability, or by stressing its technical or social and psychological aspects [7].

3.2 Model of trust

There are a significant number of available models of trust (see, for example, Abdul-Rahman [8] for a good overview), serving different purposes. Specifically eCommerce has benefited from several models, such as those described by Gonzardi et al [9] or Xin et al [10]. The following analysis uses an extended model of trust in eCommerce derived from McKnight's work [11]. For the purpose of this paper, the model has been enhanced by the additional category (general) that encompasses the fundamental properties of the environment that facilitate (even though they do not guarantee) the creation of trust. The following is a short description of the main components of the model, with particular focus on the relationship of these components to eCommerce. The name of each component is preceded by the name of the category.

- General — Evidences

Trust builds on an availability of evidences (of several different kinds) that one can use to actually justify trust. Being a relatively new experience, eCommerce should promote many different opportunities for experimentation.

- General — Identity

Trust is associated with individuals or properly identified groups. It can be reasonably believed that the reliable, usable and unobtrusive identification of all parties will greatly benefit the creation of a long-term trust relationship.

- Disposition to trust — Faith in humanity

This residual trust enables transactions between strangers and is facilitated by personal contacts, particularly hard to recreate over digital communications.

- Disposition to trust — Trusting stance

The trusting stance is a default trust-based strategy in relationships, reinforced by the reciprocity of behaviour.

- Institution-based trust — Structural assurance

The existence of structural norms and reinforcements (legal and social, but also technical) increases trust as it eliminates excessive worries.

- Institution-based trust — Situation normality

Global social acceptance of a certain activity contributes to the perception that such an activity is normal, and hence can be trusted.

- Trusting beliefs — Competence

Customer's perception of competence is driven quite frequently by the technical (e.g. response time) and aesthetic (e.g. the use of colour) qualities of the Web site.

- Trusting beliefs — Benevolence

The core of benevolent loyalty is the perception that the relationship will last beyond the single transaction. Such perception can be reinforced, e.g. by long-term identification of both parties.

- Trusting beliefs — Integrity

The perception of good faith can be increased by the transparency of actions, even if promises cannot always be fulfilled as expected.

- Trusting beliefs — Predictability

There is high expectation for predictability in eCommerce, which can be achieved, for example, by extensive usage of preferences, and the personalisation of the shopping experience.

- Trusting intentions — Willingness to depend

In eCommerce willingness to depend is strongly associated with the perception of the subjective benefit (the pay-out) of the experience. The differentiating factor is the excitement that should influence trust.

- Trusting intentions — Probability of dependence

In eCommerce the customer may have a strong perception of dependence, specifically on markets that are dominated by one or few companies, thus driven by the popularity of the merchant.

4. Convergence and trust in eCommerce

Convergence will change the way that eCommerce is conducted. Seamless, always-available connectivity will enable new forms of participation, while opening up the platform will encourage new players. Users will benefit from improved experience and from the rich selection of technologies.

Table 1 provides an overview of relationships between convergence and trust in eCommerce, as analysed in detail later in this paper. The left column

Table 1 Impact of convergence on trust in eCommerce.

Trust component	Convergence impact areas				
	Seamless security	Availability and popularity	Open platform	SIM-based technologies	Usability
General					
Evidences of trust	personalisation		low barrier to enter	personalisation	low barrier
Reliable identity	security			identity	
Disposition to trust					
Faith in humanity		interaction			
Trusting stance		interaction			
Institution-based trust					
Structural assurance	security			payment reliability	
Situation normality		popularity			
Trusting beliefs					
Competence			quality	security	quality security
Benevolence				social interaction	
Integrity					
Predictability	personalisation			personalisation	
Trusting intentions					
Willingness to depend			excitement		
Probability of depending		popularity			

contains components of the chosen model of trust, and each row of the table represents elements that affect the listed component of trust. The top row contains the list of convergence impact areas and the columns include elements that are driven by particular convergence areas.

The populated cells in Table 1 indicate a positive impact on a given component of trust from the perspective of a given convergence area. Descriptions in those cells indicate the most important impact in terms of eCommerce enablers or trust model.

The remaining analysis explores the table from the perspective of the convergence impact areas, with the short analysis linking particular aspects of convergence with trust.

4.1 Seamless security

Convergence brings about not only seamless connectivity but also seamless security — the ability to retain the same secure communication throughout different communication modes. The significant improvements in this area should come from the cross-utilisation of technologies. For example, some networks are based, at the transport level, on transport-layer security (TLS) while others use the authentication of both parties, e.g. through the use of the subscriber identity module (SIM).

Seamless security, through personalisation, affects the need for evidences. It helps to create a low entry barrier where preferences can be easily shared between

different access methods — for example, call preferences from a GSM handset can influence an IP call. Personalisation also increases predictability as different communication channels can behave in a consistent manner, driven by one set of preferences.

Seamless security will contribute to resolving the problem of identity by supporting reliable identities (necessary for the seamless security to operate) that can work across multiple communications technologies.

Finally, seamless security should positively influence structural assurance through increased fraud protection. Even though security can address only a part of a fraud problem, certain forms of fraud will be harder to implement. All participants of eCommerce will be able to benefit from continuous secure communications.

4.2 Availability and popularity

Convergence holds promise for fully pervasive communication, offering quality of service and accessibility. People will be able to stay in touch with others and with services, regardless of time, place or motion, always receiving the best possible experience.

Our society has already undergone the mobile revolution which has changed expected social behaviour and had a profound impact on the way business is conducted. However, the mobile revolution has had a relatively small impact on eCommerce, as neither the mobile device nor the communication channel has been suited to competition with the Internet-based access.

Once the mobile experience of eCommerce can rival the fixed-line experience, the social impact will multiply and the impact on trust will be significant.

Firstly, as the available communication will pervade all aspects of everyday life, on-line presence will be as important as physical presence. This will make people more accountable, which in turn should lead to improvements in reciprocity of their relationships, leading to improvements in the trusting stance and trust in humanity.

Secondly, the popularity will increase the social interaction, by providing the vehicle for building virtual social groups. This will fuel the social acceptance of eCommerce that will then improve the perception of situation normality. As the popular eCommerce activities will no longer be confined to the laptop or the workstation, eCommerce will be observed and accepted everywhere.

Finally, the popularity of eCommerce will increase the probability of dependence, as both parties will understand that the chances of being engaged in eCommerce are actually very high.

4.3 *Open platforms*

One of the attractive features of convergence is the openness of service-level interfaces. Such open interfaces should allow several parties to innovate on top of existing (and incoming) communications infrastructures, shaping the actual communication and service offerings to suit individual needs.

Such openness should create new opportunities in all aspects of eCommerce — from marketing to the actual transaction, to payment and fulfilment. Further, such openness will enable the market for innovative eCommerce platforms, decreasing time to market and barriers to entry for new eCommerce entrants, and hence increasing the ability to collect evidences.

This openness should in a longer term lead to an improvement in the quality of eCommerce. Merchants will be freed from technical obstacles while being able to address a wider audience in a more sophisticated way. The better, more innovative offer will lead to an increase in excitement associated with eCommerce, encouraging customers to test and experiment.

From the perspective of trust relationships, improved quality translates directly to the perception of competence. Merchants that are able to innovate are perceived as those who are competent enough to deal through the Internet. Rich offerings and the feeling of excitement will positively influence the willingness to depend, so that parties will be more eager to engage with eCommerce in all its forms.

4.4 *SIM-based technologies*

Converging technologies have developed different concepts of user identity and different methods to verify identity. For example, the Internet relies greatly on name and password as a primary client identification method, while GSM/3G uses a SIM for the same purpose. Existing IP telephony solutions, however, deliver quite weak proof of identity to the other party, while both fixed and mobile telephony can provide much stronger proof in a form of the caller ID.

The importance of identification cannot be overstated as this fundamental feature enables every possible relationship. Without reliably knowing the other party, it is impossible to engage in any longer-term relationship. Indeed the problem of identification of another party has been hampering the development of trust in digital systems, both at technical level and among users. Cross-utilisation of technologies may deliver solutions in the area of reliable identity, e.g. on the basis of SIM.

Improvements in reliability of the identification will benefit several eCommerce enablers, namely personalisation and payment. Merchants will be able to provide more personalised services while customers will be able to express their preferences more consistently across different communications methods. Payment will be associated with lower risk if both parties of the transaction are properly identified, thus leading to decreased transaction cost and improved speed.

From the perspective of trust, reliable identification will contribute to the assumption about another's identity, one of the assumptions that underlie the concept of trust. Long-term trust-based relationships will be encouraged as neither party will be able to rapidly escape its identity and it can be reasonably expected that in such settings parties will greatly value their reputation.

While the SIM is not only the authentication mechanism, it is a very convenient personalisation tool that can store, in a compact and secure form, individual preferences. Such combinations of authentication and personalisation create low entry barriers that will encourage participation in eCommerce, increasing the number of evidences and building trust relationship.

At the same time the SIM allows for usable security, where all the necessary settings and secrets are kept in a convenient, portable form of a small smart card. This approach increases the perception of competence by providing a high-quality user experience, specifically in the early stages of involvement.

The tamper-resistant nature of SIM can enable a payment system that is better protected against fraud without compromising the usability. This will increase the structural assurance in eCommerce. The structural assurance will also be positively influenced by the ability to construct a trusted device on top of the functionality provided by SIM.

Reliable identities combined with the ability to personalise the experience will also positively influence the subjective predictability of the other party, again increasing trust. As the same set of preferences will be available throughout different media, the relationship will become more consistent regardless of the selected method of communication.

Finally, the tangible nature of the SIM may increase the mutual loyalty between players, contributing to the benevolence. As the distribution of a SIM is costly and time-consuming, both parties will be more willing to create the longer-lasting relationship, building trust over time.

4.5 Usability

Convergence puts significant stress on the improved usability, through added capabilities, better selection of devices or better platform offerings. Usability is also essential to building trust as it lowers entry barriers, enabling people to collect an increased number of evidences.

In addition, the usability of the eCommerce experience is interpreted as a sign of a competence of the merchant, being the part of the overall perception of quality. Finally, as a part of usable security, usability will contribute to several components of trust, including structural assurance, trusting stance or identity.

5. Conclusions

Convergence will have a profound and positive impact on trust in eCommerce. Out of 12 listed components of trust, convergence has the potential to directly contribute to the improvement of 11 components, while indirectly stimulating the remaining one. Further, convergence will contribute to all eCommerce enablers, either directly (by solving underlying technical problems) or indirectly (by enabling technical, organisational and social changes).

Potentially, convergence is one of the most important changes to the global communications infrastructure as it will enable and facilitate eCommerce by increasing trust in it. The full realisation of the potential of convergence inevitably depends, though, on details of its technical realisation, acceptance and adoption rate, etc.

The cross-usage of technologies seems to address several aspects of trust, from identity through structural reassurance, competence and benevolence to personalisation. The ability to use existing technologies in different contexts may well be one of the most important impacts of convergence on eCommerce.

Even now, it is clear that technologies related to SIM (and other smart cards) have the potential to bring several benefits to eCommerce. Even though the capabilities of smart cards in eCommerce has been recognised for some time, it is only convergence that can put SIM in the centre of every communication and every interaction.

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