E-commerce innovation in the Veneto region: sociotechnical alignment in the context of a public administration

Alfonso Molina

School of Management, The University of Edinburgh,
High School Yards, Old Surgeons' Hall, Edinburgh, EH1 1LZ, UK
E-mail: A.Molina@ed.ac.uk

Mirta Michilli

Digital Youth Consortium, via Umbria 7,
00187 Roma, Italy
E-mail: michilli@gioventudigitale.net

Abstract: The paper discusses the emergence and development of e-commerce in a government context. Recently, the region of Veneto has implemented 'Bollo Auto' – the payment of car taxes through a digital network making use of lottery terminals located in the popular tobacco shops ('tabacchinos'). This paper examines this experience and asks: how is e-commerce emerging in European regions; what are the technologies used; what are the difficulties faced; what are the benefits; and, more generally, what is the nature of the processes involved in making a success of e-commerce by government? The paper deals with these questions through a combination of conceptual instruments (the 'diamond of sociotechnical alignment') and empirical analysis. In this way, the paper aims to provide insights beyond the particularities of the Veneto region, with a view to helping the understanding and practice of other e-commerce innovation processes in regional environments.

Keywords: E-commerce; regional government; car taxes; sociotechnical alignment.

Reference to this paper should be made as follows: Molina, A. and Michilli, M. (2003) 'E-commerce innovation in the Veneto region: sociotechnical alignment in the context of a public administration', *Int. J. Entrepreneurship and Innovation Management*, Vol. 3, No. 4, pp.415-425.

Biographical notes: Alfonso Molina is Professor of Technology Strategy and Director of the Technology Management and Policy Programme (TechMaPP), The University of Edinburgh. He has written extensively on innovation and technological capabilities, particularly from the perspective of his 'sociotechnical constituencies' action research program. Alfonso has worked on strategic documents for the European Commission in areas such as: microprocessors, multimedia, information society, e-commerce and technologies for major business and work challenges. He has worked with the cities of Edinburgh, Rome and Stockholm and he is Chairman of the international juries of the global contests: the Stockholm Challenge Award and Rome's Global Junior Challenge. He is presently working on stimulating the formation of a global e-inclusion movement [1].

Mirta Michilli is General Director of the Digital Youth Consortium, an organisation created by the Municipality of Rome and six information technology companies with the aim of promoting the use of new technologies for a new educational renaissance in Rome and the Lazio region. Mirta was the project coordinator of the Global Junior Challenge 2000 and 2002 [2] and was responsible for the Rome Presidency of the European Telecities network from 1998 to 2000. Prior to this, Mirta was coordinator of the Eurolaboratorio of the Municipality of Rome, an innovative department in the ICT group responsible for innovation in city services.

1 Introduction

For the past couple of years, the Veneto Region, the local authority of the region of Veneto, Italy has implemented the e-commerce service 'Bollo Auto' – the payment of car taxes through a digital network making use of lottery terminals located in the popular tobacco shops ('tabacchino')

Although the experience is recent, it represents a revealing example of a systematic development of e-commerce services by a local authority. The Veneto region is an important economic as well as political player in the region. This makes the story most interesting to examine, particularly addressing questions such as: how is e-commerce emerging in European regions; what are the technologies used; what are the difficulties faced; what are the benefits; and, more generally, what is the nature of the processes involved in making a success of e-commerce experiences?

This paper deals with these questions through a combination of conceptual instruments ('sociotecnical constituencies' and the 'diamond of alignment') and empirical analysis. In this way, the paper aims to provide insights beyond the particularities of the region of Veneto. These insights should prove helpful in illuminating the understanding and practice of other e-commerce innovation processes in different regions and should also assist other European R&D projects striving to get their results accepted and implemented into concrete regional or citywide realities [3].

In the following sections, the 'diamond of alignment' is used to assess the initial conditions and map the evolution of the main aspects of the Bollo Auto constituency-building story. It includes a description of the rationale and operation of Bollo Auto, its success in replacing the existing paper-based process by a digital electronic process, the strategic approach implemented to make it happen across the region of Veneto, the achievement of the process and the political-human aspects influencing its development.

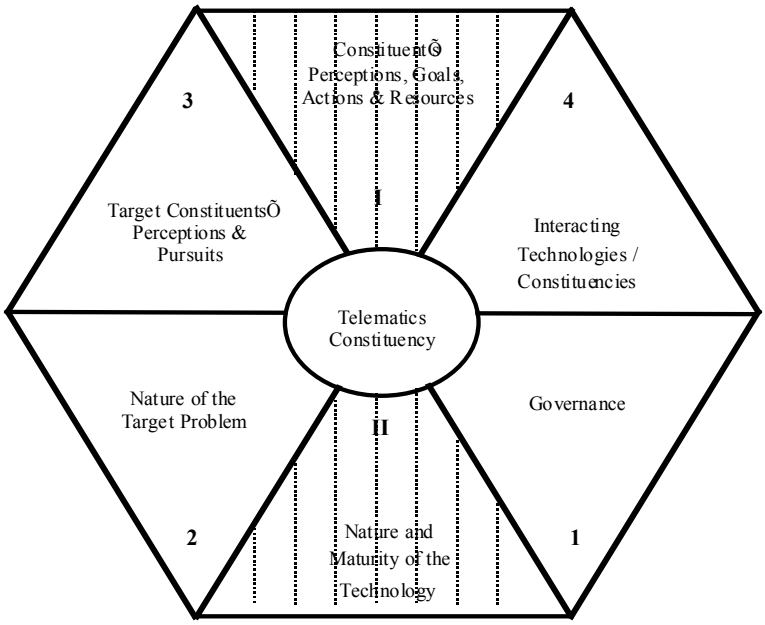
2 Sociotechnical constituencies and the diamond of alignment

The fundamental premise of the 'sociotechnical constituency' approach is that all technological innovation processes, such those of Bollo Auto, are understood to be an integration of *social* and *technical* constituents. That is, they imply the construction of 'sociotechnical constituencies' [4-9], understood as "dynamic ensembles of technical constituents (for example machines, instruments) and social constituents (for example

organisations, interest groups) which interact and shape each other in the course of the creation, production and innovation of specific technologies" [4].

How are sociotechnical constituencies built? What are the ingredients and process involved? The answer to these deeper questions is found in the 'diamond of alignment.' For, 'sociotechnical constituencies' are commonly constructed under the leadership of innovation champions or 'constituency builders' in a process of aligning people and organisations (the social) with existing target and collaborative technologies (the technological). Successful innovation requires appropriate organisational change and learning, so as to align the potential contained in the technology with the institutions necessary to harvest this potential. The 'diamond of alignment' is a conceptual tool developed to provide a structured framework with which to analyse these processes of alignment. The basic diamond of alignment, with its six fundamental dimensions for the present case study, is shown in Figure 1, below.

Figure 1 Basic diamond of alignment



At the centre of the diamond is the focus of the constituency-building process, in our case, the build up of a telematics constituency. The shaded areas I and II represent the sociotechnical nature and state of development of the overall constituency (intra- and inter-organisationally) at a given point in time. In turn, the surrounding four segments (1, 2, 3 and 4) represent dimensions of critical influence to the success or failure of technological processes. Table 1 gives a description of the content of each of these dimensions in the diamond.

Table 1 The content of the dimensions of the diamond of alignment

(I) Constituents' perceptions, goals, actions and resources
This relates to the present state of the constituency's resources: the type of organisation, people, material and financial resources, knowledge, experience and reputation. It also includes other elements such as current perceptions, goals, visions and strategies.
(II) Nature and maturity of the technology
This dimension highlights the importance of the nature and maturity of a technology for its successful constituency-building process. Adopted strategies must align with the strategic opportunities and constraints implicit in the particular technologies. Thus, emerging technologies, such as e-commerce systems, imply different requirements from other, more mature, technologies.
(1) Governance
This dimension highlights the importance of aligning the constituency-building process with the governance and strategic directions of the organisational, industrial and market environments in which it is expected to flourish.
(2) Nature of target problem
This dimension highlights the importance of alignment between the capabilities of the emergent constituency and the requirements for successfully introducing new technologies. This includes alignment between the technology and widely agreed technical and market trends and standards in the target market area.
(3) Target constituents' perceptions and pursuits
This dimension relates to the people and organisations the constituency is seeking to enrol behind it. This includes the alignment of perceptions and goals between the constituency itself and its target constituents in organisational, industrial and market environments.
(4) Interacting technologies/constituencies
This dimension relates to the interaction a constituency has with other existing or emerging technologies. No constituency emerges in a vacuum. Other technologies, trends and standards may impact upon the constituency's technology in both competitive and collaborative ways.

Each of the diamond's dimensions influence each other and, put simply, act as an overall setting and guide to alignments between people-people, people-technology, technology-people and technology-technology. A successful constituency building process is a virtuous cycle in which all types of alignment reinforce and strengthen each other. However, mis(non)alignments can reverse this process, creating a vicious cycle exacerbating internal and external conflicts and contradictions. Indeed, care must be taken that alignment in certain directions should not involve potential misalignments in others. Table 1 details the content of each segment and the issues of alignment posed for each segment of the diamond.

3 The constituency-building story of Veneto's 'Bollo Auto'

3.1 Overview of initial conditions

Until very recently, car owners in the region of Veneto visited the offices of the Automobile Club (ACI) or the Post Office and paid the taxes for each of their cars. The process was nationally controlled from the Ministry of Finance, where a national database registered the data of all car owners in Italy. Car owners handed over their

payment and received their tax receipt in return. This is the way it has happened for years: electronics was in the Ministry's back office database and people and paper were in the customer interface and transaction.

All this began to change in 1998 when the Italian government passed and implemented the Bassanini Laws, with the aim of streamlining the cumbersome Italian public administration procedures and stimulating the process of decentralisation of control of services and taxes to the regions. This, in turn, demanded and helped to create a more fertile ground for the introduction of new information and communications technologies. These factors have been highly synergistic and have effectively stimulated the emergence of public administration e-commerce in the Veneto region. At least this is the message that emerges from the story of Bollo Auto - the payment of car taxes through digital terminals. In effect, soon after the Bassanini Laws and the decision to decentralise some taxes and corresponding competences to the regions, the national and regional governments conferred about how to start the effective implementation of this law. It was considered that the best way to start was to select an area where the transition to a regionally decentralised service would be propitious and without too much upheaval. The area identified was car taxes, given the direct importance and impact of cars at the local level, particularly in terms of costs generated for local authorities. The immediate first step was the integration of three different databases (held respectively by the Ministry of Finance, the Public Register Office and the Automobile Club Italia) into a single one that could be devolved to the regions to manage. This set in motion a constituency-building process requiring significant realignments regarding the previous way of providing the service, both technically and socially. Table 2 shows the initial conditions of this process according to the diamond of alignment.

These initial alignment conditions have shaped deeply the content, magnitude of the challenge and achievements of the experience of Bollo Auto. The next section follows the story of this constituency-building process, seeking to identify and explicitly point out the influence of the different dimensions of the diamond of alignment.

3.2 Bollo Auto: strategic approach and sorting out of initial misalignments

The constituents who championed the Bollo Auto constituency-building process wanted a solution that would work and be successfully implemented. In their view, there was little room for experimentation with advanced technologies and services, for instance, through the internet. Change was simply demanded by government and it was better to take a safe approach by adopting proven mature technological solutions. This led to a novel network solution based on mature technology, namely, to adopt the existing ISDN-based network of terminals used by the lottery network and installed in thousands of tobacco shops across the Veneto region and, indeed, the whole of Italy.

The realisation of this solution however, was not necessarily simple and the following technical and social alignments and realignments became critical to the success of the new e-commerce system.

Table 2 Overview of initial alignment conditions

(I) Constituents' perceptions, goals, actions and resources
The constituents of the Bollo Auto process came from three different government organisations with a role in the 'car tax' arena, in particular; the Veneto region who wanted the decentralisation, the Ministry of Finance who controlled the previous system and were now promoting the decentralisation to the regions, and the Ministry of Transport through the Civil Motorisation and the Public Car Registry (PRA) in charge of property registration and transfers. Initially, the alignment of constituents was based on the perception that change simply had to happen, as was required by the new law. This, however, did not imply an easy alignment of goals and consequent actions. Interestingly, a key private sector constituent of the previous system – the Automobile Club Italia - who quasi-monopolised the payment office in the country was reluctant to join.
(II) Nature and maturity of the technology
Three elements are critical: databases, network infrastructure and networked digital payment terminals. From the old system, there was the legacy of three different car databases held by the Ministry of Finance for tax purpose, the Minister of Transport for car registrations and transfers and by the private Automobile Club Italia (ACI) for tax collection and the provision of services to clients. These three databases had to be merged into a single one and then 'regionalised.' In this way, regional decentralisation and national unity and compatibility would be maintained. The immediately available network infrastructure was a mature Integrated Services Digital Network (ISDN) run by Lottomatica, the National lottery system, and covering the whole country. This national dimension was important because the same system would be adopted by all the regions of Italy, providing unity and compatibility. At this stage the internet was not a contender, as e-payment was not yet considered secure. Regarding digital payment terminals, computers were in the same category as the internet. There were also networked lottery terminals available in the 'tabacchino' shops that belonged to the lottery system all around Italy.
Alignment (1) – Governance
There were two levels of governance of importance to the emerging constituency-building process. First, at national level, the change of governance brought about by the Bassanini Laws. This provided a stimulus to the streamlining of government services and the use of IT in government (e-government). Another national/regional governance factor was the political will to encourage decentralisation of services and taxes to the regions. Secondly, at regional level, the previous car tax system had operated primarily through a sort of private-public partnership, where the Automobile Club Italia (ACI) played a major role in collecting the tax from car owners.
Alignment (2) – Nature of the target problem
The target problem was confined to transforming the car-tax payment system. Firstly, from a national to a regional base and into an e-commerce system and, secondly, seeing it widely implemented across the region of Veneto. This implied the integration of different databases, the regionalisation of the unified database and the development of an infrastructure of networked terminals across Veneto. It also implied aligning all necessary organisational constituents.
Alignment (3) – Target constituents' perceptions and pursuits
The stimulus for the e-commerce car-tax constituency-building process started at national government level. It was then necessary to enrol all those parties required to make the Veneto e-commerce system a reality. This included providers of networks and terminals and all car owners. It also included the Automobile Club Italia, who maintained a database of car owners and were not keen to re-align into the new process and into a less powerful position in the constituency.
Alignment (4) – Interacting technologies/constituencies
Two types: firstly, the integration of the e-commerce system would bring together a variety of databases held by the different institutions with a stake in the old systems; in turn, this had to be integrated with a network infrastructure and multiple networked terminals capable of executing e-payment; secondly, as an effort to bring a new e-commerce service to the City, the car-tax constituency-building implied the displacement of old methods of providing services.

3.2.1 Technical constituents: database, network and e-payment terminals

This involved the integration, updating and regionalisation of a unified database. This eliminated obsolete entries such as dead persons, etc. and sectionalised the single unified database into regions, thus enabling the regional management of car taxes. It included integrating data from databases kept historically in different government departments. For instance, if somebody died, this was previously entered first in the Public Car Registry and then would reach the car-tax database. At the same time, the virtual regional database could not be regionally exclusive. It had to be aligned and interoperable with other regional databases in Italy. This would maintain national unity of data and allow car owners to pay their taxes, not only in their own regions but also everywhere else in Italy, whilst ensuring that taxes paid by residents of a particular region go directly to that region and not first to the national government, as in the old system.

The adaptation of the lottery network and terminals to receive car tax e-payments presented no major difficulty.

Overall, the entire technical process was highly tractable given the maturity of the technologies involved. It took around one year to complete. At the same time, the solution is highly specific and we may find that there will be a requirement to evolve towards other technologies, such as the internet, in the future. For the time being, however, the solution implemented has successfully introduced e-commerce into the arena of public services in the Veneto region.

3.2.2 Social constituents: similar governance/different players

The most important tensions faced by the Bollo Auto constituency-building process were in the alignment of the social constituents implied in the newly adopted technical solution. In effect, the new e-commerce service meant the enrolment into the constituency of a new private sector partner, Lottomatica, the company running the lottery in the country. It also meant the enrolment of the tobacco shop's ('tabacchino') owners and ultimately that of the car owners themselves. None of this represented a real problem since the previous service of car-tax payment had been run by a private sector organisation as well – the Automobile Club Italia - and the Post Office. In this sense, the governance relation between public and private sector did not change fundamentally. Likewise, tobacco shops and car owners were not a problem; after all, the new solution provided clear business benefits and convenience and required insignificant training in new skills. Indeed, the mechanics of the transaction are virtually the same as buying a lottery ticket. The customer arrives at the tobacco shop (see Figure 2 for picture of 'tabacchino'), gives the assistant the number of his car plate and the appropriate amount of money, the assistant uses the adapted lottery terminal (see Figure 3 for a picture of the terminal) and gives a tax receipt to the customer. Process completed.

The real problem occurred as a result of the power realignment implied in the abandonment of the old system. The Automobile Club was reluctant to accept the new system, given that the shift of roles meant a clear displacement of their central position to a more marginal position. Why did the Automobile Club not seek to provide the network itself and reproduce its central position in the new constituency?

Well, this was difficult to do, given that they would have had to generate a network such as the one the lottery already had and, even so, they could have never matched the huge number of outlets offered by the 'tabacchino.' The emergence of the Bollo Auto

constituency was, therefore, bad news for the Automobile Club and they did become reluctant to join the new constituency. For car owners, however, including those in the Automobile Club, the new e-commerce system has increased the convenience and the quality of the service.

For all these reasons the Bollo Auto constituency-building process is now successful. It took a total of two years to realign the databases and face the realignment of relations between organisational constituents. This rather short period for the implementation of the systems is largely the result of a mature-technology approach that facilitated the technical build up of the constituency. The new organisational constituency was also successful because all the parties necessary to make the system work became effective members of the constituency. The stakeholder organisation that contested the emergence of the new lottery-based constituency had lost its central role and it had no real power to stop the success of the new constituency. Thus, however desirable it was for the Veneto government to have the Automobile Club inside the new constituency, the dynamics of the new Bollo Auto system did not critically require the Club to make the system a reality adopted by car owners in the region. The system has now been operational since the beginning of the year 2000 and Table 3 shows the current alignment conditions according to the diamond.

Figure 2 Counter of 'Tabacchino' with lottery terminal enabled for car tax e-payment

Figure 3 Lottery terminal enabled for car tax e-payment

Table 3 Overview of current alignment conditions

(I) Constituents' perceptions, goals, actions and resources
As the constituency-building process took hold in the region of Veneto, there was a natural shift in the relative weight of the original constituents towards regional players. The main new players are now the lottery company, Lottomatica, and the 'tabacchino' shops that house the terminals and provide the new interface with the car-tax payers. The alignment of players is no longer on the basis of legislation that had to be implemented, it is on the basis of business and service benefits for all those who are now part of the system. The Automobile club, who quasi-monopolised the payment office in the Veneto region, is still reluctant to support the new constituency.
(II) Nature and maturity of the technology
The technological approach adopted was the use of mature technology. Of the three critical elements, the first, the database, was solved by the integration, 'clean up' and regional sectionalisation of the legacy national databases of car data. The second and third elements, network infrastructure and e-payment terminals, made use of the ISDN network and adapted lottery terminals placed in the 'tabacchino.'
Alignment (1) – Governance
Firstly, the favourable governance factors created by the national Bassanini Laws and decentralisation continue. Secondly, at regional level, the new e-payment car-tax system continues the private-public partnership governance already implemented in the previous system. The major change is in the private sector player, with Lottomatica emerging as the new service provider.
Alignment (2) – Nature of target problem
The original target problems have been effectively solved, both in a technical and social sense. The e-payment system has been in operation since early 2000. True, the re-alignment of the Automobile Club Italia was not entirely successful. On the other hand, this re-alignment was not an absolute need for the success of the new constituency. The target problem is no longer the creation and spread of a sociotechnical constituency. The Bollo Auto constituency is moving into a more evolutionary phase of maintenance and trouble-shooting, until further radical technological developments are once again needed.

Table 3 Overview of current alignment conditions (continued)

Alignment (3) – Target constituents' perceptions and pursuits
With the e-commerce system in place, new car owners and those who may not have paid their taxes remain target constituents. The Automobile Club also remains a target constituent and, indeed, dialogue continues with the Club for this purpose. The Club lost out in the new constituency and, not unexpectedly, their perception is not the most favourable.
Alignment (4) – Interacting technologies/constituencies
The new e-commerce system now successfully integrates database, network and terminal technology. It is proprietary and self-contained. The old system has been displaced and new upcoming possibilities, such as the internet or I-TV, are not yet foreseen for implementation. The Veneto region is maintaining an eye on future developments, however, as a partner in European R&D project Centuri21. This project is looking at the internet provision of a variety of services – Veneto's designated areas are tourism and culture.

4 Conclusions and Lessons

The Bollo Auto e-commerce experience in the region of Veneto is rather recent. Nevertheless, it is revealing in the lessons it provides of success factors that may serve to illuminate the e-commerce efforts of other cities and regions. These are among the most important:

- favourable change of legislation providing a fertile environment for the flourishing of regional e-commerce initiatives in the tax arena
- political will to see the implementation of changes at regional level that created the pressure for change to happen
- perception that the initiative had to succeed in a relatively short period of time leading to a focus on the service and the choice of mature technologies to transform it. It was a service-led not a technology-led process
- availability of technology network offering a mature network/terminal infrastructure for relatively smooth implementation of the new service
- easy transition for users to the new system, facilitated by the adoption of an easy and well-known user interface in the lottery terminals
- easy transition of business arrangements, as the relations between public and private sector was basically the same, although with different players
- high convergence of interests among all constituents based on a win-win situation
- weakness of opposition brought about by the shift of system and the same shift eroded the power base of this opposition

The fundamental general lesson of the success of Bollo Auto lies in the overall combination of the specific identified lessons that facilitated the harmonious convergence of all dimensions of the diamond of alignment in a relatively short period of time. This successful constituency-building experience should prove an important step in the e-commerce learning process of the region. By making it explicit, this paper expects to contribute to its wide dissemination in Veneto, Italy and Europe.

Acknowledgements

Many thanks to the following members of the Regione del Veneto, who kindly gave their time and support to this case study: Mr. Bruno Salomoni, Head of the IT Department; Ms. Nicia Meterazzi, senior officer in the IT Department; Rossano Favaretto, Centuri21 secretariat; Gigi Cogo, IT expert of the IT Department; Pier Francesco Ricci, Coordinator of Centuri21 for Regione del Veneto; and Luca Laroni, assistant to the Coordinator of Centrui21.

References

1 www.e-inclusionsite.org

2 www.gjc.it

3 Another paper contains references to the role of the Veneto Region in the development of Centuri21, an internet-based one-stop-shop joined-up government European R&D project. See Helios (2001) *In Pursuit of the Vision of One-Stop-Shop Joined-Up Government Services: The Constituency-building Story and Challenges of European Project Centuri21*, Project PACE, December.

4 Molina, A. (1990) 'Transputers and transputer-based parallel computers: sociotechnical constituencies and the build up of British-European capabilities in information technology', *Research Policy*, No. 19, pp.309-333.

5 Molina, A. (1997) 'Insights into the nature of technology diffusion and implementation: the perspective of sociotechnical alignment', *Technovation*, Vol. 17, Nos. 11/12, pp.601-626.

6 Molina, A. (1999) 'Transforming visionary products into realities: constituency-building and observacting in the case of NewsPad', *Futures*, Vol. 30, No. 9.

7 Kinder, T., Klaes, M. and Molina, A. (1999) 'Sociotechnical alignment in the build-up of a telemedicine constituency in Scotland', *Science and Public Policy*, Vol. 26, No. 6, pp.415-435.

8 Collinson, S. and Molina, A. (1998) 'Reorganising for knowledge integration and constituency building: product development at Sony and Philips' in R. Coombs, K. Green, A. Richards and V. Walsh (Eds.), *Technological Change and Organization*, Edward Elgar, Cheltenham, Glos., UK, pp.76-107.

9 Klaes, M. (1977) 'Sociotechnical constituencies, game theory and the diffusion of compact discs: an inter-disciplinary investigation into the market for recorded music', *Research Policy*, Vol. 25, pp.1221-1234.