

# Value-Creating E-Government Business Models for Early Childhood Education in Finland

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## ABSTRACT

*In many cases, e-government is considered a name for transforming informative public services into electronic mode, although the focus of e-government should be on creating value for citizens as well as public organizations. In this article we apply Amit and Zott's (2001) e-business value creation methods to an e-government environment, namely early childhood education in Finland. The objective of the collaborative action research study was to find out what kind of business models in e-government would create value for citizens. The methodological result based on the collaborative nature of the study is a method for analyzing and generating business models. Amit & Zott's framework also seems to be applicable to the e-government environment, and we were able to draw many viable business models for early childhood education, which forms the practical contribution of the study.*

*Keywords: Please provide*

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## INTRODUCTION

The diffusion of e-government has been slower than the diffusion of e-business and many applications are designed from an organization-centric view, not from a customer- or citizen-centric view (Marche & McNiven, 2003). In

some public sectors use of information and communication technology is a quite recent development and they do not have the capability to fully utilize it. One of these public sectors in Finland is the state- and municipality-controlled early childhood education (ECE), the environment for this research.

E-government is often perceived as a channel for government to offer information-intensive public services in electronic form. Janssen, Kuk, and Wagenaar (2005) have studied and categorized e-government business models in the Netherlands. According to their research, most of the e-services in the content and direct-to-customer (e-government) business models were intended to make existing information and services available. They recommended that value creation should become an essential part of e-government.

Amit and Zott (2001) have presented value creation methods for e-business. We will extend the scope of their model to the area of e-government. The new model has been applied in this action research study in Finland. The context of this paper is the ECE service provided by a public organization and the purpose is to study how e-government creates value for customers or citizens.

In the research area of e-business, the customer is in a central role. In the field of e-government, the concept of "customer" could be considered too narrow. When we use public services we are customers, but at the same time we are citizens, who have more power than ordinary business customers. As tax payers, we are also owners of the public service providers and as citizens we are also subjects with obligations (Mintzberg, 1996). One of our obligations is to rear our children to be good citizens. Early childhood education shares this educational responsibility with us; therefore, parents and ECE have a so-called ECE partnership.

The article is organized as follows. In the next section we outline the theoretical basis of the study. The third section describes the case, ECE in Finland, which is followed by a presentation of the collaborative research method used in this study. The fifth section highlights the results against the theoretical framework. Finally, the discussion and conclusions section concludes the paper.

## **THEORETICAL BACKGROUND**

One of the various definitions of a business model states that it "is a method and a set

of assumptions that explains how a business creates value and earns profits in a competitive environment" (Lumpkin & Dess, 2004). Since government or public organizations are usually nonprofit organizations and the financing comes from the tax payers, the business model for government should be a method and set of assumptions that explains how a public organization creates value and does not make losses in a competitive environment. After all, some government services compete with private service providers, which is the situation with ECE services in Finland.

According to Lee, Tan, and Trimi (2005), the purpose of e-government is to offer the citizens valuable and quality public services and information on the Internet. Although it is possible just to digitize the services, for example returning a tax form, the best value from public e-services is gained when different public organizations horizontally integrate their processes in order to provide a "one-stop" e-service point for citizens (Lee et al., 2005).

Referring to Lumpkin and Dess's (2004) definition, the idea of an e-business model is to gain profit and create value for customers by using the organization's existing resources on the Internet. Value creation in e-business has been studied by many authors in recent years. Lumpkin and Dess (2004) themselves discovered that search, evaluation, problem-solving, transaction activities, and different types of content may create value for a customer online. Zhu and Kraemer (2005) assert that value is created in e-business with transactional efficiencies, market expansion, and information sharing and integration. Barua, Konana, Whinston, and Yin (2001) argue that operational excellence is a key element in e-business value creation. Porter (2001) explains that the Internet can create value for buyers by increasing consumers' ability to negotiate with traditional channels, and thus eliminate them.

One of the most used value creation models is by Amit and Zott (2001), who have presented four possible sources of value creation, specifically efficiency, complementarities, lock-in, and novelty. Since public organizations should also

be focusing on creating value for the citizens, these value creation methods could be applied in an e-government context.

Amit and Zott (2001) define efficiency based on transaction cost theory (see Williamson, 1975)—namely, “transaction efficiency increases when the costs per transaction decrease.” In e-business, the transaction efficiency can be measured by comparing transaction costs between different Web shopping sites or online and offline channels. In e-government, the transaction costs could also be measured by comparing transaction costs between online and offline channels, for example returning an application for ECE in the traditional way by mail or electronically via the Internet. Transaction efficiency can also be improved by reducing information asymmetry between customers and providers, as well as streamlining transactions (Amit & Zott, 2001).

The second value creation method in e-business introduced by Amit and Zott (2001) is to offer complementary products and services. In e-government, vertical complementarities could be, for example, after-transaction services (after registering as a student in a university, the new student can access electronic libraries and other online resources) or horizontal complementarities—such as a one-stop e-service point (the ECE Web pages containing all child-related services offered in the municipality, including private organizations and associations).

According to Amit and Zott (2001), lock-in is the third means of value creation in e-business. Lock-in refers to customers’ unwillingness to transact business with other service providers. In e-government, customers or citizens are seldom able to choose between service providers unless they either move to another municipality or country or there are public and private service providers to choose from. Therefore, the lock-in could here refer to the unwillingness to change the transaction channel from offline to online or vice versa. If citizens are offered benefits (loyalty programs) by using online services, or customization options on the Internet, they might be locked-in to using the online channel. Another lock-in strategy for e-government

could be to empower the citizens, namely offer them a means to interact with and influence the public organization.

Novelty is the last value creation method in e-business suggested by Amit and Zott (2001). E-businesses and public organizations may introduce new services on the Internet, as eBay introduced the customer-to-customer Internet auction or a small Finnish IT firm introduced an online service for parents, who during their working day may look at pictures of their children taken with a multimedia mobile phone by the day care teachers.

### **CASE: EARLY CHILDHOOD EDUCATION IN FINLAND**

According to Andersen, Grönlund, Moe, & Sein (2005), Finland was ranked quite well (second to ninth) in five different international e-government rankings published in 2004-2005. Although there is always need for improvement, the Finnish government has succeeded in eliminating and simplifying unnecessary process stages with information systems in many cases. For example, this year, instead of filling in the complicated tax return by themselves, all individual tax payers received a tax proposal—a pre-filled tax return—since all the information on wages, paid taxes, social benefits, and so forth, has already been reported to the tax administration.

However, there are public sectors where e-government does not ring a bell and information technology is thought to complicate the daily routines. In 2005 the Ministry of Social Affairs and Health launched an Information Technology Project for the Social Sector, which aims to integrate the existing information systems and create new service conventions and process structures (<http://www.sosiaaliporssi.fi/tikesos> in Finnish). In the course of the project, child protection services, distance interpretation services for deaf people, virtual communities for alcoholics, and so on, have been developed. This research group chose ECE services, the users of which are young parents who are familiar with information and Internet technology. The difficulties in adopting new technological in-

novations in ECE had been noticed in previous studies by the research group; therefore, we are aiming to contribute to the practical daily routines of ECE as well as the theory with collaborative action research.

In Finland the concept early childhood education refers both to the research as well as the education and care of children below compulsory school age (seven years). Day care is a public and official place where the latter comes true. The significance of ECE has been eloquently summarized by Blenkin, Rose, and Yue (1996), who state that “early years are arguably the most significant period of children’s education and their first encounters with education are, therefore, of fundamental importance.”

ECE has different levels in Finland. The state has a central role through a steering system. The state’s instruments are steering by norms or rules, financial resources, and information. The Day Care Act has more importance than before, when there were, for example, limits on the number of children in child groups. Nowadays, municipal authorities are in charge of organising the services at the local level. After decentralisation and legislative changes, the state gave more power to municipalities at the beginning of 1990. Nowadays we have a skeleton law guiding 420 municipalities. As in the other Nordic countries, the share of private day care in Finland is very low.

Since the establishment of the Day Care Act in 1973, public discourse has primarily circled around day care. In the 1970s and 1980s, Finnish day care was mostly led by employment politics, because of the strong urbanization and mothers beginning to work outside their homes, which is still an issue in many countries (OECD, 2006; Ojala, 1993). It can be said that the pedagogical and developmental needs of children were ignored and the changes in the working culture, or adult-centred factors, were the main reasons for developing this kind of system in Finland.

However, every now and then the focus of day care has also been directed to children; for example, in 1980 when the Committee of Edu-

cational Objectives (1980:31) gave directions for public day care. In 2002, after the Council of State defined the policy for early childhood education, the focus of ECE has definitively changed more to education (Valtioneuvosto, 2002). As a summary, it can be said that the Finnish system has long traditions of separating education and care, and these two views have not always met in state-level planning and strategies. There is even a bit of this incoherent approach left in the current state of ECE in Finland (c.f. OECD, 2001, 14, 164).

Nowadays, every child has a statutory subjective right to receive public day care and the municipalities are responsible for organizing a placement according to demand. Day care mostly takes place in day care centres or in family day care. ECE is offered for children between the ages of 0 and 6. ECE emphasizes the qualitative (developmental) outcomes of day care. The main objective in day care is to promote the child’s healthy growth, development, and learning skills. The social task of ECE includes the promotion of the child’s social, intellectual, and emotional development. Day care should also offer a favourable context and activities that support and guide the child’s development and learning (Day Care Act 117/1983). The central values in ECE—in addition to the right to live and fully develop—are nondiscrimination and equal treatment, the child’s best interest and giving due weight to the views of the child (Stakes, 2005). Day care should also support parents in raising their children (Day Care Act 36/1973). Parents are seen as partners, but their influence or participation in group education is not very significant. There is no formal Parent Teacher Association in Finland and parents do not work as volunteers in day care centres. There is a need for more participation by parents.

By legislation, the ratio of day care educators (=teachers and nurses) to children is 1:7, when children need whole day care services. The maximum group size should be 21 with 3 adults (Day Care Degree 806/1992), but unfortunately this is not the case today. In many child groups there are more children than there should be. Group size can vary from 18 to 38 children in

whole day care groups (Pihlaja & Junttila 2001; Social and Health Ministry, 2005).

The administration of ECE and day care institutions is divided between two branches. The National Research and Development Centre for Welfare and Health has guided the formulation of the National Curriculum Guidelines for Early Childhood Education and Care (Stakes, 2005), while the National Board of Education has responsibility for the core curriculum for pre-school Education (Opetushallitus, 2000). This disintegration is changing however; one-third of the municipalities have already integrated preschools and comprehensive schools. In the same way, more than 10% of the local and municipal day care (both day care centres and family day care) is connected to the educational administration. The day care system is already administered by the Ministry of Education in all of Finland's neighbouring countries (Sweden, Norway, Russia, Estonia). Finnish preschool is intended for children of 6 years of age, in contrast to many European countries where preschool is a system that is meant for younger children. In Spain or in Sweden this means children between the ages of 0 and 6 and in France between 2 and 6 (Pre-School and Primary Education in the European Union OECD, 2006; Pre-School and Primary Education in the European Union, 1994).

The ECE in Finland has recently faced many challenges or threats. Simultaneously, as the number of children has risen and the number of employees has decreased, the quality of the pedagogical context has declined. The proportion of teachers in day care among all employees has decreased, which is one reason why the pedagogical competence has lost its value (Kauppinen, 1995; Kinos & Laakkonen, 2006; Pihlaja & Junttila, 2001). Since there are fewer teachers in proportion to the larger number of children, teachers have less time to educate and have to spend more time on operative care work as well as administrative tasks. The economic depression of the 1990s has left its marks on services directed to children and families, as it was these services that suffered the most cut-offs (Hermansson, Karvonen, &

Sauli, 1998). The day care educators suffered hard times for a number of years, and some municipalities complain that "saving money" seems to have come to stay. Work-related stress, emotional pressures, and the pace and intensity of work increase with the growing demands of efficiency (Seddon, 2000). This is apparent in the case of day care personnel as well (Pihlaja & Junttila, 2001).

Of staff working directly with children, about 30% have a tertiary degree (bachelor or master of education, or bachelor of social science), and the rest an upper secondary level education. According to the OECD (2006), this percentage of tertiary trained pedagogues is low compared to Denmark (60%) or Sweden (51%). Possibly as a result of the reduction in the proportion of teachers, the municipalities' net cost for one child has decreased from 390 € in 1997 to 329 € in 2004 (Kangasharju & Aaltonen, 2006). Despite such changes, the political pressure to improve the quality of ECE has increased, which calls for effective systems and high-quality ECE competence.

The current educational challenges and need for improvements are linked to competence and teamwork with multiprofessional educational teams and parents. Growth in tertiary trained staff, administrative clarity, and integration with the education system are the main macro-level objectives in the near future (e.g., Kinos, 2006).

## RESEARCH METHOD AND DATA COLLECTION

Rapoport (1970, p. 499) has defined action research as follows: "Action research aims to contribute both to the practical concerns of people in an immediate problematic situation and to the goals of social science by joint collaboration within a mutually acceptable ethical framework." This two-fold view of the objectives of action research—to solve a problem for a client and to advance science—is, perhaps, the most fundamental feature of action research (Baskerville & Wood-Harper, 1998; Susman & Evered, 1978). Action research is widely used in the field of education (Carr & Kemmis,

1983; Stringer, 2004) and was therefore familiar to both IS and ECE researchers, the authors of this article. **Collaborative action research** emphasizes the interdependence of the activities of university academics and educators to converge practical and theoretical knowledge between research and field work (Kemmis & McTaggart, 2000).

This collaborative aspect and teamwork between the scientists and professionals in ECE, as well as the scientists of information systems and software providers, has been the backbone of our research. Although the software providers have not participated in multiprofessional teams during the process, they did provide the researchers with many valuable viewpoints on ECE software at the start of the research project.

The authors participated as facilitators to establish the ECE network in southwest Finland during the period May 2005 to April 2006. Our practical objective was to establish a collaborative network and produce an initiative for the development of ECE practices and information systems. This process has been described in a previous publication (Järveläinen, Kestilä, Koskivaara, Pihlaja, & Salmela, 2006).

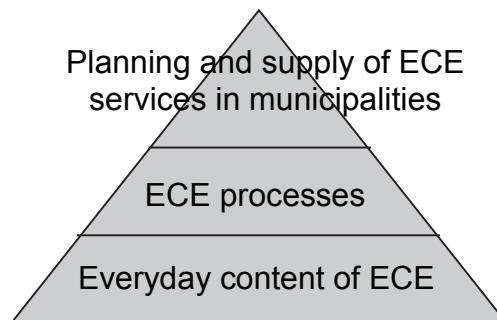
After producing the initiative, the decision makers in four municipalities in southwest Finland decided that ECE in each municipality needed both collaboration and efficiency in developing processes and the content of e-serv-

ices. The directors of ECE in the municipalities presented the forthcoming research project (described in this paper) to their subordinates and appointed them to the project based on their area of expertise and/or interest. The 50 ECE professionals involved in the research project had different professional backgrounds, varying from the Director of ECE to day care teachers and administrative officers. To facilitate the smooth flow of the research, the whole research project had a steering committee composed of the directors of ECE in each municipality and ECE and IS academics.

Before the actual research process started, the researchers divided themselves into three interest clusters. The three interest clusters were based on previous research results (Järveläinen et al., 2006): A) municipal planning and guidance of services, B) ECE processes, and C) everyday content of ECE (Figure 1). The academic researchers were divided into the clusters so that the A and C interest cluster had both ECE and IS academics, and the B cluster only IS researchers.

There were three primary research questions in the planning and supply of services (A) interest cluster: what kind of information is required to forecast the demand of ECE services, and how is the overall guidance of the ECE services and entrance into the ECE services managed. At the moment, forecasting ECE service demand is very challenging because the

*Figure 1. Division of clusters and working groups in the research project*



required information is either missing or hidden somewhere in the organization or society. The guidance of ECE services and the entry process varies a lot between municipalities and neither of these is supported with Web-based technologies. If these tasks were to be supported with decision support systems, the scarce resources could better be allocated and families as well as children could get better services.

In the ECE processes (B) interest cluster the work focused on recognizing routine work in day care centres, which has been done manually, and then attempting to find a technological solution that would transform the manual work to automatic. If repetitive manual work could be converted into automatic tasks, the day care teachers could spend the saved time on education, since they are professional educators.

Interest cluster C initially had four main themes, which were integrated into two main areas. The first main area was to develop the day care planning process at a yearly, monthly, and weekly level, and integrate this planning with communication with parents. The planning process would generate information for parents with regard to the timetables and content of the activities. The second main area was to integrate the purchase of games and tests that support the growth and detection of learning problems into one regional and jointly owned professional organization. The integration should solve the problem of choosing usable and evaluated material from the pile of possibilities for day care staff.

The research reported in this paper had six phases (Table 1). These phases varied

from lectures to group and team work as well as individual work between workshops. The process started with an orientation meeting, which included short lectures on the challenges and opportunities of adoption of information technology (IT) in the Finnish ECE. This orientation session was followed by dividing the participants into three working groups based on the interest clusters. Some rough group divisions had been already made in the municipalities in advance of the orientation meeting based on the interests and professional background of the participants. However, some of the professionals switched over to other groups during the process, since their expertise would benefit other groups better.

The planning and supply of services (A) working group participants were 10 ECE professionals—including day care centre managers, day care teachers and day care services area managers—and four scientists, three from the ECE field and one from the information systems field.

The ECE process (B) working group participants were 15 ECE professionals—including day care centre managers, day care teachers, day care coordinators and administrative officers—as well as four information systems scientists.

The everyday content of ECE (C) working group participants were 21 ECE professionals—day care centre managers, consultant special teachers and day care teachers—and two IS researchers and a ECE researcher.

During the orientation meeting, a short briefing on the focus of each working group was

*Table 1. Research process from the top down*

Phase I	Orientation lecture and briefing of group and team homework		
Phase II	Homework in municipalities and the research community		
Phase III	Workshop A/1	Workshop B/1	Workshop C/1
Phase IV	Intermediate assignments per teams in groups and the research community		
Phase V	Workshop A/2	Workshop B/2	Workshop C/2
Phase VI	Ideas for service development in ECE		

given to the ECE professionals in the form of an interactive lecture. The professionals were given homework related to the focus; for example, in the municipal planning and guidance of services group the tasks were to consider the current processes of 1) municipal planning and supply of ECE services, and 2) overall guidance of the ECE service and entrance into ECE services both from the family's point of view and from the child's point of view. After the briefing the research process continued with two group meetings, that is workshops, for all three individual working groups.

The homework was discussed in the first workshop. For instance, in the A and B working groups the "learning café" method was used to facilitate the discussion. The workshop participants were divided into three small groups and given problems, such as "What kind of time consuming, repetitive tasks you do daily/weekly/monthly?" in the ECE processes working group. In the method, the problems are written on large pieces of paper and put on so-called coffee tables, and a group of four ECE professionals discuss a problem for 10-15 minutes. After this, one participant stays at the coffee table as the other group members move to the next table. The remaining member reviews the issues that have been discussed for the new members and they then discuss the problem for another 10 minutes, and possibly generate new ideas.

After having been to each table, the whole group is collected together and each idea is reviewed and briefly discussed in order to pass the tacit knowledge from the ECE professionals to the academics. Further development ideas are then selected based on how much time the task consumes, whether the task is a problem in at least two municipalities, and whether a technological solution could be generated for the task. This learning café method proved to be very useful because 1) the ECE professionals had not been able to generate these ideas as part of their homework, 2) the IS researchers were unfamiliar with everyday life in day care

centres, and 3) the ECE professionals were used to handling problems by discussing them. However, in this first workshop meeting the participants in working group A argued that the municipal level of planning was too demanding, so this task was passed to the project steering committee.

The working group C had a different approach because of the larger number of participants. Four team leaders were selected from amongst the working group participants, one from each municipality, and they discussed the issues with the members from their own municipality and communicated the results to the researchers. In addition, the team leaders engaged in planning the workshops and the issues that were discussed during the workshops.

Before the second workshop, the working group participants were assigned new homework, such as "In the first workshop you recognized that you spend a lot of time on calculating wages for family day care teachers. How do the family day care teachers communicate their working hours in your municipality?" In the second workshop the selected developments ideas and the IT solution innovations were presented to the practitioners, who considered the benefits, risks, and costs of the ideas and were able to abandon impractical IT solutions. After the second workshop the remaining development ideas were discussed and presented to the steering committee.

Accumulation of information during the research process was essential for the results of the research, that is ideas for service development in ECE with the help of IT. Figure 2 shows how the collaborative action research accumulated the information in this case. The role of the ECE professionals was to bring the challenges of daily ECE work into the research project. The ECE researchers were responsible for introducing the newest research results in their field. The IT researchers' role was to introduce the possible IT innovations that might be suitable for ECE purposes. Furthermore, both ECE and IT researchers worked as "interpreters" for the process of adaptation of IT in ECE.



## RESULTS

Each working group generated several IT solutions for different ECE development problems, which mirror the value creation methods presented by Amit and Zott (2001). The problems and IT solutions presented below were accepted by the working groups, but the steering committee and municipalities will later make the choice regarding further development between the remaining solutions.

### Efficiency

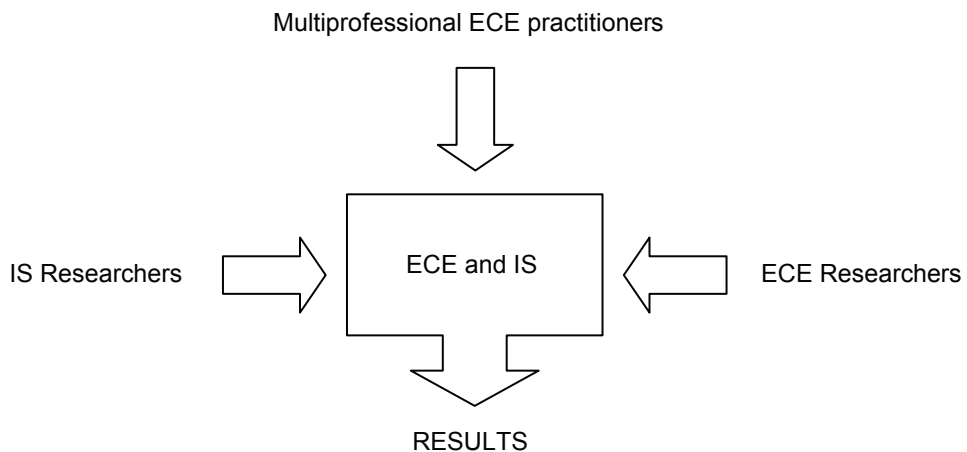
One of the problems recognized in working group B, ECE process, was that the billing information was gathered manually in both day care centres and family day care (by filling up a paper diary with the exact time a single child arrived and was picked up), and these manually filled diaries were then entered into the billing system by an administrative officer. In addition to entering errors, the billing process was slow and inefficient. The arrival/departure information could be gathered automatically with RFID technology; each child could have an RFID transponder that would enter the correct information direct to the administrative information system used in the billing, thus improving the transaction speed. It would also

help in forecasting the service needs in each day care centre since the data could be analyzed to better focus human resources based on the families' service needs.

Another problem recognized in working group A was that customers should be better informed about all the ECE service alternatives. Furthermore, guidance of the ECE services, as well as the entry processes, varies a lot among the municipalities. The guidance could easily be supported with Web-based technologies. There should also be access to complementary information from partner or private firms and societies. This would reduce the asymmetry and provide parents with accurate information. According to the ECE professionals, the updating of Web sites would be too demanding for them. Therefore, they would like to have reliable and clear information from an external provider to support different kinds of families with their challenges.

The major problem in planning and forecasting the ECE service demand was that there was no systematic way of gathering the information. IS researchers recommend that what information really is needed should be studied first. Thereafter, data warehousing and data marts could be built, such as on a municipal or some district level, to provide information

*Figure 2. Knowledge creation in the project*



for decision support. In the long run this would help decision makers focus resources efficiently and effectively.

The problem in purchasing educational games and tests for learning and detecting learning problems has been the amount of material and unfamiliarity with the content. The required skills and know-how can be centralized within an organization or unit that concentrates solely on the evaluation and purchasing of such material. The horizontally coordinated unit could be regional, consisting of members from several municipalities, who could then use the services of the unit. The benefit for a single day care unit would be to receive professionally evaluated information on the material that would enable them to choose the games they need or are interested in.

The problem in communication between parents and day care has been that the information about the day care centre has not always been unambiguous and available when needed. The solution for this could be a portal, where the information about weekly activities, and an electronic notebook or e-mail would be provided for the parents. One feature of the portal could be the possibility to report a child's absence, for example, 24/7; thus the information sharing would improve both ways. Parents and staff could discuss the situation of a single child in a trusted part of the portal, if necessary. Another part of the portal could contain public information to which all the parents and staff would have access.

### **Complementarities**

The centralized purchase of games and tests would also improve sharing know-how and experiences. The centralized purchase would, therefore, not only improve efficiency but would also be a complementary service in that it would offer a bundle of material for a purchaser. This material bank would be a one-stop service point where all the related information and material would be available.

The information portal would also offer complementary services in the form of an e-portfolio on the growth of a child. For example,

photos, drawings, and other productions of a child made during her/his day care time could be included in the e-portfolio, and the staff, parents, and even the child, could follow his/her development over the years.

### **Lock-in**

An electronic notebook could also be used in locking in the parents. The use of a manual notebook for the communication between home and day care has been difficult in some cases, since the information in the notebook cannot be checked if the book is in the wrong place. The information on the Internet portal would enable a parent to check information while at work or at home.

Amit and Zott (2001) suggest that one strategy for locking the customers into the system is to provide them with loyalty programs. A loyalty program in ECE could resolve the problem of resource focusing. Nowadays, if a child becomes ill during the night, parents have to wait until morning to call day care about the child's absence that day. Often, the absence information is received late, which is especially inconvenient if the child has a special diet and his or her meal has to be customized. Such calls force a teacher or manager to be in the office, and the parents should also wake up early to make the call—even after staying up most of the night. The parents could also send a standardized SMS message or use the information portal to report their child's absence 24/7, and this information could be shown on the manager's and kitchen's desktop in the morning. Parents who report the absence in good time, for example before 7 a.m., could be given a discount. According to the ECE professionals, this kind of loyalty program could have a lock-in effect, but it could also be seen as a complementary service since it integrates the different parts gathered in the billing information—a kind of supply chain integration.

The information portal could also create a lock-in effect if it were to be used for parent empowerment. As described, the parents could have a virtual community for sharing contact information and event photographs with each

other, but a parent's association could also use the portal for information sharing, communication, and surveys, which could in turn be used for communicating with the day care centre or municipality.

### **Novelty**

The novelty of the information centralization is concretized in combining the different products in one location. In addition to offering services to parents, centralization could produce benefits from integrating the portal into the planning process of yearly, monthly, and weekly activities.

Parents seldom have an opportunity to talk with other parents because they might not see each other in the mornings and evenings. A virtual community for parents would offer an opportunity to exchange experiences, phone numbers, arrange their child's visits with a friend, distribute photos of events, and so forth. This kind of novelty incentive would improve the communication and, for new parents especially, it would offer a way to get information on daily routines or habits in day care.

### **DISCUSSION**

The empirical data collected during the workshops illustrates the variety of possibilities for improving day care services with information technologies. Such technologies can improve the management of services, facilitate the implementation of day-to-day routines and contribute to ECE objectives.

All four value creation types represent e-government business models. Automation of service invoicing represents an efficiency type of model. Complementary products and services are represented by adding information from several partner organizations to day care Web pages. Lock-in value creation is perhaps not so obvious in the public sector. However, applications that support parent-teacher interaction can be seen as increasing parents' commitment. Even if parent lock-in is not needed in a similar manner as in private businesses, such commitment will bring several benefits during the customer relationship. Finally, fostering

parent-to-parent communication on the Web would meet the criteria of adding novelty to the service (see Table 2).

The case does, however, also illustrate problems related to implementing these business models. The state has a central role in the development of ECE. The state's steering instruments are norms or rules, economic steering, and steering by information. In some sectors, such as healthcare, state-level authorities have taken responsibility for building a national IT infrastructure to support service delivery. In the day care sector, this work is still in its infancy. Furthermore, the implementation will be based on laws that require both key software vendors and municipalities to implement the required systems.

The municipal authorities are in charge of developing the services at the local level. Hence another approach to realizing the potential of Web-based systems is voluntary implementation by municipalities. Here, the need to support investment decisions with an explicit business model is a prerequisite for making any progress. In a difficult financial situation, the decision makers in the municipalities will not be using money to build new systems unless there is evidence of clear and immediate benefits.

This research used collaborative action research to investigate and document potential business models for different innovations. Because action research is a qualitative research method with a small sample size, it is vulnerable to positivist critics (Checkland, 1991). Because it attempts to contribute to practical concerns, it is sometimes confused with applied research or consulting (Jönsson, 1991). However, action research can follow rigorous guidelines. One of the principal guidelines for conducting action research is that the researchers should make their reasoning explicit and organize it in such a way that it is testable (Argyris, 1982; Checkland, 1991).

The action research cycle consists of five stages: diagnosing, action planning, action taking, evaluating, and specifying learning (Suman & Evered, 1978). The diagnosis of ECE organizations studied in this reported study is

Table 2. Summary of e-government business models in ECE

Value creation method	Foundation of business model	Value created for customer by the business model
<b>Efficiency</b>	Increasing transaction speed	Service bills are generated more quickly (B)
	Reducing asymmetry of information	Customers are better informed about the service alternatives (A)
	Focusing the resources better	Electronically gathered information can be used for forecasting the service need in the future (A + B)
<b>Complementarities</b>	Improving horizontal coordination	Joint and centralized evaluation and purchase of games and tests supporting learning and detection of learning problems (C)
	Improving information centralization	Portal for the communication and information sharing between parents and day care (C)
	Combining online and offline resources and capabilities	E-portfolio about the phases of growth of the child for the use of staff, parents, and child (C)
	Access to information from (partner) firms and customers	Information from partner organizations such as parents association (A)
	Sharing know-how vertically	Centralizing the purchase and evaluation of the educational games and tests in one professionally skilled unit, enabling the day care unit to gain just the games and test they want and need (C)
<b>Lock-in</b>	Supply chain integration	Real-time information about the number of children (B + C)
	Customized and/or personalized offerings and features	Electronic Notebook as a parent-teacher communication channel in daily use to ease the information flow about the everyday activities in day care (C)
	Loyalty programs	Customers get a discount through informing the day care of absences in time (B)
	Empowerment	Web pages for the parents association (C)
<b>Novelty</b>	New combinations of products, services, information	Weekly programme and other information in electronic form, can be integrated with parent's calendar (C)
	New incentives (e.g., customers can create content)	Community for parents for discussion, sharing photos, coordinating play dates, and so on. (C)

that at least three problems have emerged in recent years:

1. "Net generation" parents demand services on the Internet;
2. The workload of ECE professionals has increased;
3. Advancements in information technology should be taken into account in ECE.

The action planning stage of this study took place in the orientation lecture and homework

phases when the diagnosed problem areas were defined in more detail. Detailed plans for different workshops were formulated based on the feedback from practitioners. The planning stage identified potential business models to be addressed in the three workshops, and the working methods to be used. In the action taking stage the feasibility and benefits of selected business models were discussed in the three workshops. The evaluation and specifying learning stages materialized when the business models were continuously evaluated at the same time as

the ECE professionals learned how IT solutions could assist them in their daily work and were able to give feedback on the suggested business models.

The organizational setting for designing business models can be characterized as very challenging. The changing nature of the service (from day care to education), shortage of resources, large number of different projects, lack of information management skills and resources, monopoly position of a few software vendors, and so on, all make it very difficult to create a positive atmosphere for "yet another project."

Nevertheless, the experiences from the process are positive. The practitioners were very committed to the project and discussion in the workshops was very active. The process has also assisted the workshop participants to differentiate between viable and nonviable ideas and to prepare business cases for those that seem most promising. The immediate feedback from the municipalities concerning the working methods has been positive. The process has resulted in service improvement proposals containing an explicit description of the business model. These proposals will be distributed to the decision makers, at both the local and the national level.

### Contributions for Research

Earlier conceptual research on e-business business models has primarily focused on the context of the private sector. The focus of this research is on the use of business models in the public sector. This article reviewed the literature on business models, selected one framework and adapted it to the context of e-government. The use of the framework is illustrated through the analysis of business models in one sector of public services, ECE.

This article also contributes to the literature on methods for designing business models. The method used in this case emphasized interorganizational collaboration in analyzing the business rationale behind different ideas. The process consisted of workshops in which

practitioners and researchers could discuss potential applications, the associated service process changes and the benefits that implementing new processes and systems could bring. In particular, the work focused on the early stages of the innovation process in an organizational setting, where the organizations' innovation capacity was limited.

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