Exploring the Innovation Application of Web Camera Based on Business Models - Taking Parent-Baby Communication as an Example

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ABSTRACT

In the high technique modern society, there are many ways to communicate with others. People anticipate the technology could not only connect to others but also help to sustain the relationship of family or friends. Recently, people turn to take internet as the main way to communicate. On the other side, in the phenomena of low fertility, the market in babies and children will be important in the future. This research wants to start from the existing web-video and web-communication technology and figures out the new ways to apply this technology in parent-baby communication or interaction. As one of the device in web-vision technology, web-camera is the device that being chosen to use in this research. Apply this technology in parent-baby communication. Let family realistically use this device, and have an interview to understand the experience that family use this device. After the interview, analyze the result and find possible way that applying this web-vision technology in parent-baby communication. Finally, use existing business models to think new application, and explore the innovation application of web-camera in parent-baby communication.

Keywords: web-video, parent-child communication, innovation application

INTRODUCTION

The study aims to explore the innovation application of web-camera based on business model. There are some trends in modern society. In the high technique modern society, there are many ways to communicate with others. People could use various ways to connect to others. Since the development of technology, people increase their demand and anticipant in communication. They anticipate the technology could not only connect to others but also help to sustain the relationship of family or friends. That means, the user's demand is not only in function side, but also for feeling the experience in connection and interaction with others. Besides, demands on translating messages, pictures and videos increase greatly. Recently, since the internet is convenient and cheap, people turn to take internet as the main way to communicate. On the other side, in the phenomena of low fertility, parents are willing to spend more money on their child. Because of the raising trend of purchasing power, the market in babies and children will be important in the future.

There are two main purposes

(1)To understand the process and experience of how families use web-cameras. Then, find out possible application of web-vision technology.

(2)To figure out the connection between innovative applications and business models and consider if they have business potential in the market.

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In the first point, this purpose helps us to understand the value and some important functions that families find out after using web-camera. In the second point, after realizing what families thought about the device, we discuss possible innovative application and combine with business models.

LITERATURE REVIEW

Business models

(1) Circular flow model

In this model, supposing a simple single market situation in a country. As shown in the figure (Figure1) which was simplified by us, there are only household and firm in this market without considering government. Besides, although the household and the firm are in a large amount in reality, we suppose all the households are same and so as the firms. It also means that there are not any transactions between all the households and between all the firms. All these supposes are great different from real situation but it is a sufficient way to simplify and understand the content of market economy. Taking Fiture1 to illustrate the circular flow model, the rectangles in left and right side are two economic unit in the market - the households and the firms, the rectangles in the top and the bottom are goods and services market and factor market. As shown in this graph, the households supply factor to factor market and get income which was used to buy goods and services in goods and services market. In the other hand, the expenses of the households become the income of the firms, then the firms could use these income to buy the capitals which are needed in producing products and services. Finally, the costs of these capitals go back to the households as their working income. The illustration is according to the inside circle which stands for the currency flow. In the meanwhile, the outside circle is stand for the goods flow. When the market economy is not affected by anything, this circulation would continue again and again (UBC Wiki, 2011). There is other study talked about circular flow model in similar way (Beggs, n.d.). In the circular flow model, we could understand that the whole market economy is the result of multiple benefits with the circulation of comedy and currency. After understanding the circular flow model, try to find out that is there any similar cases also generate benefit with the circulation of comedy and currency. Afterward, take a famous auction website as an example to analyze the way that they could make multiple benefits and manage in a long-term.

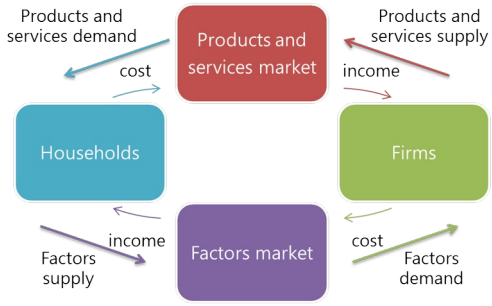

Figure1. Circular flow model (Tsai & Chang, 2008)

(2)Auction website - E-Bay

E-Bay provides a virtual platform which is a platform could buy and sell between buyers and sellers. From the idea of circular flow model, we use a figure (Figure2) to present the way E-Bay manage. The auction website, the buyers, and the sellers stand for different three economy units separately. In the picture, the arrows turn out two circulations showing the expense and income of three units. The buyers buy merchandises form sellers through auction website, and the sellers take the income to pay the fee of post their comedy in this auction website. To auction website, they have to spend money on managing their website for absorbing a large amount of buyers and sellers and attracting buyers buy merchandises from sellers in the auction website (Collier, 2011). This is a multiple benefit model to make more than two economy units could benefit. The auction website build a platform between buyers and sellers and make a profit for three parties. It is a vital reason to sustain this model running smoothly.

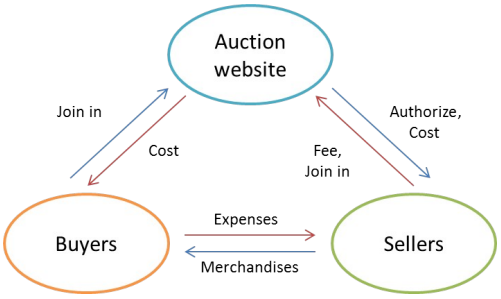

Figure2. Multiple benefit model- E-Bay (Lee, 2013)

Innovation applications of web-vision technology

In web-vision technology, there are some applications about web-vision technology. There is a case that apply web-vision technology in creative way (Figure3). Two Taiwanese Lee and Chen (2012) who participate Red dot design award bring out an innovation idea to apply web-camera. Beginning from a simple idea, they think the possibility to use the athlete's perspective to see the baseball game. As a result, they figure out a mini web-camera that could be pressed on the athlete's cloth and combine smartphone, application and wireless signal transportation. The audience could scan the QR code from the tickets and watch the game in the athlete's perspective. Besides, the innovation application also could use in the strategy discussion between the team members to review the game in different angles.

Other case is BH I.concept fitness equipment (Figure4). The fitness equipment company BH release a series of running machine and fitness bicycle which combine an application - Run on the Earth designed by Google map(BH, 2013). The users could put their PDA or smartphone on the machine and by downloading the application they could choose various routes and enjoy their running with street scenery in different countries. This function also could be connected to the big screen to bring more wonderful experience to the customers (BH, 2012).

Another case is Virtual Box. The service provider use internet and vision to build a system for passing information, picture, video, and so on. The users use computer and PDA (Personal d Digital Assistant) to interact. The idea of this design comes from a traditional game – hide and seek. The rule of this game is that one person should go to find out the virtual objects which have been hidden by other person already. There is a graph to illustrate the process of virtual box. As shown in the figure (Figure5), there are five phrases in virtual box. Through this design parents and child could interact with each other. After trying this game, most of the participants (parents and grandparents) really enjoy the process of this game. Some parents and grandparents mention in the interview that they are closer to their children and have a really excellent experience in this game (Davis & Skov & Stougaard & Vetere, 2007).

Others cases are talked in several studies. For example, picture blog to let family members share pictures and experience in the platform and every family members could get information easily from the platform (Dalsgaard at al., 2007).

Figure3. FANs Cam (Lee and Chen, 2012)

Figure4. BH I.concept fitness equipment (BH, 2013)

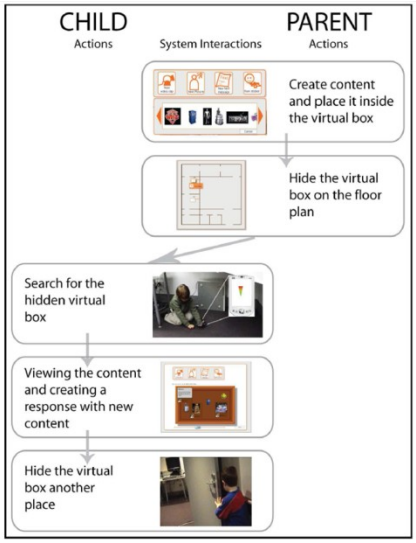

Figure5. Action and interaction flow for Virtual Box. “Hider”(Parents) interactions to the right and “Seekers”(Child) interactions to the left.(Davis & Skov & Stougaard & Vetere, 2007)

METHOD

The research methods which would be used in this study show as a figure (Figure6). In the beginning, we would ask our interviewees to use the web-camera to watch their babies for about one week. At the same time, we would give them some small tasks to take some pictures or videos for us. At the end, when those families finish using the web-camera, we would have an interview to ask them the experience about the device. In this study, there are three methods used to collect and analyze data. In data collection side, semi-structured interview and observation are two methods used to gain the data from the interviews. In the other hand, grounded theory is a vital method which used to analyze the data. Based on the grounded theory, it could help us to find the results from the interviews.

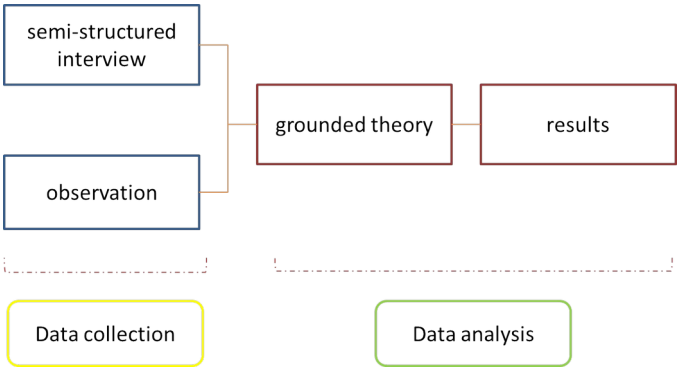

Figure6. Research method (Lee, 2013)

Data collection

In data collection part, there are two methods help us to collect the data. The semi-structured interview is the method that makes some structure before interview. When the interview carries on, the interviewee would follow the structure but allow some changes in the interview. There is the outline of the interview questions. On the other side, observation is also an important way to collect the data. The pictures and videos are nice elements to collect and could be analyzed to support interview result. There is a table (Table1) reveal the content about five interview topics

which is related to our research questions, the examples of interview questions, the data resources and methods, and the anticipation which present the possible data we might gain from the interview.

Table1. Data collection (Lee, 2013)

Interview topics	Interview questions example	Data sources and methods	Anticipation
(a) Is there something special happening in the week?	(a1) Please describe something interesting that make you remember most, such as special behaviors or movements of baby?	(1) interview parents (2) documentary analysis pictures and videos	(1) Interview will provide how parents see or feel something interesting or special in the week (2)Analysis of pictures and videos will reveal the important moment which something special happen.
⋮	⋮	⋮	⋮
(d) What possible applications are related to the web-cam?	(d) Please think about any possible applications of web-cam and give the reason why you think those applications are helpful to you.	(1) interview parents	(1) Interview will provide possible applications which interviewees think about by using the web-cam.

Data analysis

In data analysis part, grounded theory is the method used to illustrate the result. Grounded theory could reveal important contents from the interview by coding (Flick, 2009). There is a figure (Figure7) which reveals the process of data analysis. First, transform the entire interview recording to transcript. Second, do open coding and list all coding beside the transcript. Third, do axial coding and class different types of codes. Fourth, do selective coding to find the connection between different categories. Finally, draw the story lines to analyze the conceptual model and answer the research questions. This is a reversible process. If there are any problems generating, the coding process should be repeated again and again until the result could answer the research question.

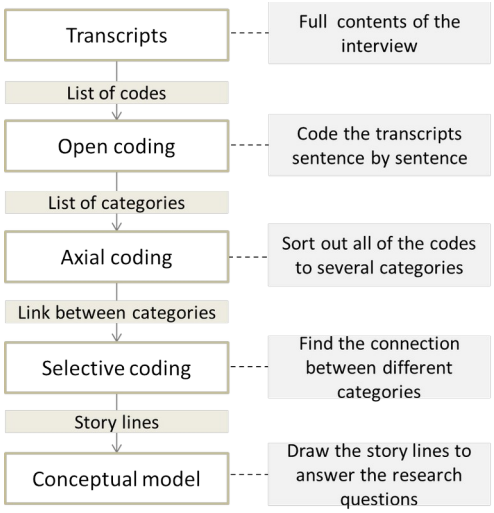

Figure7. Grounded theory (Lee, 2013)

RESULT

These are three family cases in our research. In here, we take one case as an example to illustrate our interview

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results. The result is including recording data analysis and pictures observation. The recording data analysis would conclude important elements through four phrases. Besides, the pictures observation reveals some interesting moments of the babies.

Case 1

(1) Axial coding

There are eight categories of codes- A-Function related, B-Baby behaviors, C-Parent related, D-Possible application, E- Different ways to communicate, F-Setting location, G-Privacy, and H-Affordable rent. We take two categories as examples in this part. There are few branches in every category. In A- Function related group, A1- drawbacks, A2- important functions and A3- not use web-cam are included in this group. The codes are included in A1- drawbacks such as 1-difficult to set up, 41-remote control function isn't sensitive enough, and 83- only one people could use the application in the same time. In B- Baby behaviors group, B1- special behaviors, B2- imitation, B3- drinking milk and B4- sleeping observation are four branches included in this group. The codes are included in B1- special behaviors such as 9- baby's special behaviors, 12- high value of special behaviors, 46- record funny movements, and 48- precious baby's behaviors, usually once only. By axial coding, we could sort out all of our codes to eight categories and several branches within these categories.

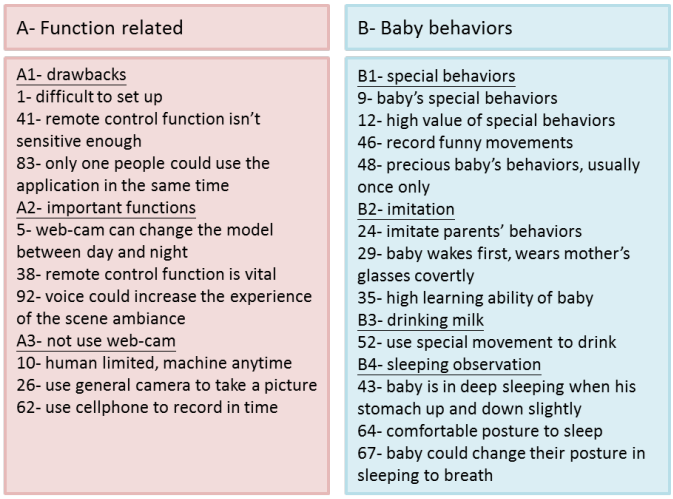

Figure8. Two categories of axial coding (Lee, 2013)

(2) Selective coding

There are five main parts of codes- A-Function related, B-Baby behaviors, C-Parents' related, D-Possible application and E-Different ways to communicate. In selective coding part, it is important to find the links between different categories and branches. There are two examples to show the result of selective coding. As shown on Figure7 and Figure8, there are various connections between big parts and small groups. Some of them which relate to other parts or groups use general blue line while the others of them which are cause-effect relationship use blue arrow. There are two groups about C1-parents' status and C2-parents' feeling in C-Parents' related part. C2-parents' feeling can be influenced by B-Baby behaviors part which includes B1-special behaviors and B4-sleep observation in it. In A-Function related part, there are three groups about A1-drawbacks, A2-important functions and A3-not use web-cam. The code G-privacy issue is related to A1-drawbacks. On the other hands, the group E2-web-cam is related to A-Function related part.

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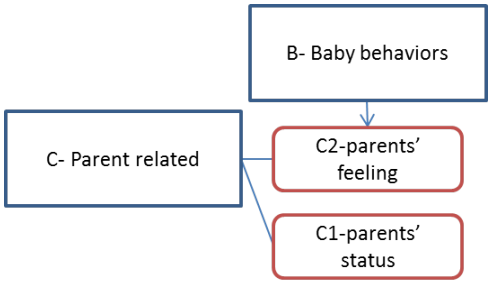

Figure9. Selective coding (a) (Lee, 2013)

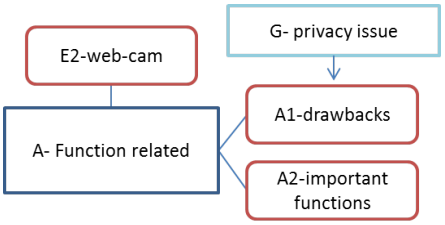

Figure10. Selective coding (b) (Lee, 2013)

(3) Conceptual model

As shown on these graphs, five research questions (a), (b), (c), (d), (e) could be explain in different parts and groups. There are various connections between big parts and small groups. Some of them which relate to other parts or groups use general blue line while the others of them which are cause-effect relationship use blue arrow.

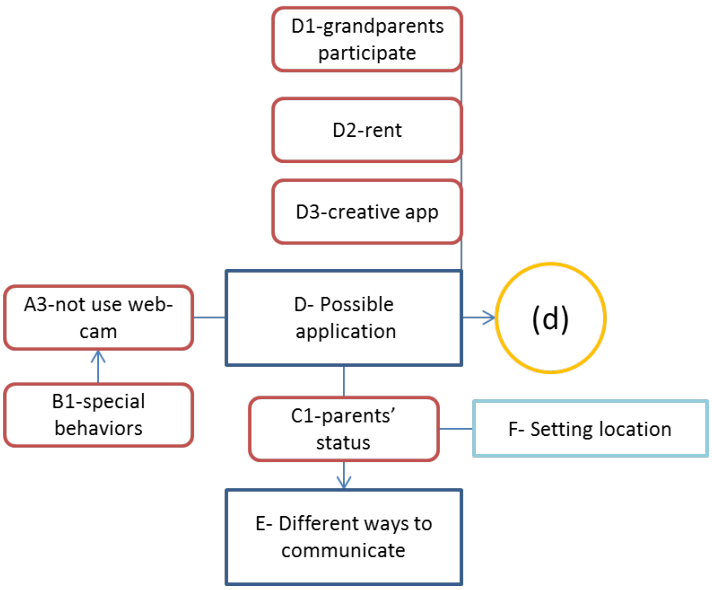

Figure11. Story line (d) (Lee, 2013)

In D-Possible application part, there three groups about D1-grandparents participate, D2-rent and D3-creative app. In the meanwhile, some B1-special behaviors would bring about the phenomenon A3-not use web-cam and A3-not use web-cam may generate D-Possible application. Besides, C1-parents' status which also generate D-Possible application is related to the code F-setting location and affect part E-Different ways to communicate and part D-Possible application. All these D-Possible application could influence the result of research question (d)- What possible applications are related to the web-cam?

(4) Pictures

There are some pictures which we gained from the family. They mention that it is not easy to capture baby's special behaviors. Since the parents have no idea when their baby would have special behaviors, it is really hard to prepare a camera and take a picture all the time. There is an example in the figure below (Figure 11). The two pictures in Figure 11 were not taken by the web-camera but a phone camera. The parents talked about that sometimes they found some special behaviors of their baby which usually flashed suddenly and shortly. As a result, when they saw those special behaviors, they had to find a camera and take a picture instantly. Otherwise, those special behaviors of their baby were usually onetime thing and were hard to be seen in the future. The left picture presented that baby woke up first and imitated parents to put glasses on their face when the mother was sleeping beside him. This picture

was taken by the father who found out this moment suddenly and took his phone camera to record this cut movement. The right picture revealed that baby drank with his foot holding the bottle tightly. The father told us that baby held the bottle with his hands first and slowly released the hands to use the foot to hold the bottle. It was the first time they saw this interesting movement. The other two pictures in Figure13 are taken when baby fell asleep. The father told us that it is enjoyable to see his baby sleeping. He said it would make people feel peaceful when looking baby in sleeping. Besides, the father mentioned the function that he could take a picture or see the baby in dark room. He thought it is really a nice function because he could see the baby without opening the light and waking up the baby.

Fugure12. Special behaviors (imitate and drinking milk) (Lee, 2013)

Figure13. sleeping observation (Lee, 2013)

Innovative applications

After interview and analyze the data, we find some important elements from those families. Those families provided us the experience and feeling that they use the web-camera Those informations that they talked about in the interviews are very helpful to inspire us think about the innovative applications of web-camera. There are three innovative applications of web-vision technology that we figure out after considering the needs of the families.

(1) Rent the service

Based on circular flow model, we think that there could have a flow between family and mobile application company. Family could use their old cellphone as web-camera and settle on the seat. In the way, cellphone could work just like the functions which web-camera has. We think this kind of service would be provided in the form of mobile application. People could enjoy similar functions without out buying web-camera. All they need to do is that rent the mobile applications and download to their devices such as cellphone, pad, or computer. The mobile application company has to secure the operation of their mobile application and provide related service to their customers (Figure14).

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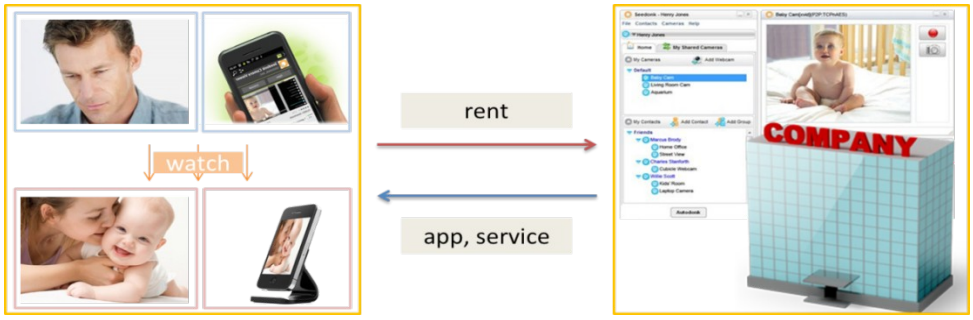

Figure14. Rent the service (Lee, 2013)

(2) Apply in the hospital

When baby get sick and has to stay in the hospital, parents and other family members are usually nervous and anxious. As a result, we think that the web-camera could be applied in this situation to help family to take care and understand baby's condition. With the web-camera family members could enter the application and see the baby anytime they want even in the midnight. Although they couldn't stay beside the baby, they could also concern about baby's condition (Figure15).

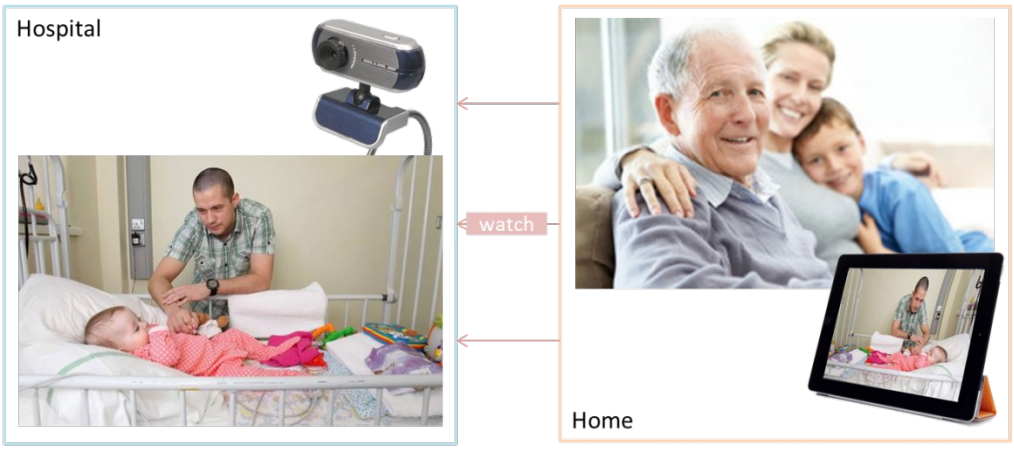

Figure15. Apply in the hospital (Lee, 2013)

(3) Combine with the stroller

The idea comes from the event data recorder. Through analogy, it flashes in our mind that we could set the web-camera in the stroller. With this device many cute and interesting behaviors of baby could be recorded when parents bring baby out. Besides, family members who are not stay with baby in the same time could also watch the cute pictures and videos. For example, father who works busy or grandparents who don't live with grandchild could enjoy these precious images in baby's daily life. It could help to increase their feeling of participating baby's life (Figure16).

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Figure16. Combine with the stroller (Lee, 2013)

DISCUSSION AND CONCLUSIONS

In this study, we anticipate finding innovative application of web-vision technology. At the present stage, there are three families participate in our study and were interviewed by us. Through the interviews it reveals much information about how those families feel about using web-camera to watch their babies and what the most important things about using this device. By observation and interview we figure out some innovative applications about web-vision technology. Besides, one of them is based on business model which might have business potential in the future. Since these innovative applications are based on the opinions which were provided by the interviewees, we think it would be helpful to families which have babies. At the next phrase, after figuring out these innovative applications, we anticipate using business models to certify that these innovative applications could have business potential in the future and take these innovative applications to ask the thought of our interviewees.

There are some deficiencies about our study. Those innovative applications which we figure out are hard to judge by criteria if they are useful or helpful to the families. We could just use the second interview or some business models to check if these innovative applications could be helpful and have potential in the future. Besides, we think web-vision technology could be used very well in many other sides. Our study only focuses on parent-baby side and we strongly believe that there are more innovative applications in other situations.

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