

# Service Design Strategy for Social Internet of Things in China

Jijia Chen<sup>1,2</sup> 

<sup>1</sup> School of Social and Behavioral Sciences, Nanjing University,  
163 Xianlin Avenue, Xixia District, Nanjing 210023, Jiangsu, China

<sup>2</sup> School of Industrial Design, Nanjing University of Arts,  
15 Huju North Road, Gulou District, Nanjing 210013, Jiangsu, China  
chachachen@126.com

**Abstract.** Chinese people has experienced fast iteration of lifestyles within 30 years. The Social Network and the Internet of Things seem to invade their lives. And the combination of them will be more evolutionary.

In this paper, firstly, the author explains two typical examples of the Social Network event in China and leads to the three conclusions: Socialization is an inevitable trend for any kind of product on the internet society, China will not be an exception; Any service designed for socialization on the internet in China should be tightly fit to Chinese tradition and culture; Smart phone plays the role of ‘smart’ intermediary in these scenarios. Secondly, based on the review of the Social Network and the Internet of Things, the author concludes that novel concept of SocialInternet of Things (SIoT) is based on a sort of social relationship among objects, analogously to what happens for humanbeings. It has the advantages of navigability, scalable, trustworthiness and openness. And the core issue of the Social Internet of Things is how to make different objects socialized. In the third part, based on the description of the development of the Social Network and the Internet of Things, the author finds out three strategies for objects to establish the relationship. By the analysis of each strategy, the author finally points out that services designed to achieve symbiosis will be the strategy for the Social Internet of Things.

**Keywords:** Service design · Social Internet of Things · Design strategy

## 1 Introduction

Before the eve of Chinese Spring Festival, the most heated topic online is “how to collect the professional blessing card?” Professional blessing card is believed to be the most difficult one to collect in acquiring the 5-blessing card. Professional blessing card, together with another four cards, which are patriotic card, prosperous card, harmonious card and friendly card, can be converted into one card: 5-blessing card. And one 5-blessing card means a free ticket to participate in a carnival of sharing two hundred million RMB together with other 167,966,715 Ali-pay users in one lottery. No matter how little each 5-blessing card holder can have at last, Jack Ma (the actual manipulator of Ali-group) has beautifully beaten Pony Ma(the actual manipulator of Tencent-group)

in their payment competition among Chinese users this year. Around spring festival in 2014, Pony Ma started to introduce WeChat payment in its social platform. By adopting genius-like brilliant service strategy of handing out red packets among WeChat users, over one hundred million Chinese users has bound their bank accounts to WeChat payment just in two weeks. And WeChat payment has been widely used ever since. Before that, Jack Ma has consumed almost ten years to promote and brand Ali-pay. In the annual meeting of Tencent in 2016, WeChat payment team has won the highest level of internal prize-“The Famous Hall”. This prize is established in 2015 by Pony Ma to honor the highest milestone of the development of company in one year. And the number of the prize is one hundred million RMB. It is reported that WeChat Payment has won Ali-pay in off-line payment in 2016 (Fig. 1).



Fig. 1. Steps to collect the 5-blessing card

This story is a typical example of how Chinese internet company use social network to compete in one area. From the story, we can notice that there are not only the service contents that make Chinese people indulge in the social activities, but also the strategy to make what kind of service contents should be paid attention. The service design strategies in the above stories indicate that:

**Socialization is an inevitable trend for any kind of product on the internet society, China will not be an exception.** There are two kinds of internet product in China: content internet product and function internet product. The former concentrates on helping or encouraging its users to generate communicative information. This product

itself can be considered a platform which carry different users as the content providers. The latter is much simpler; the user will have nothing to do with it when its certain function has been used. This product is really worry-saving for its developer. The key point is the maintenance of the technology in order to achieve better user experience, not the maintenance of the content in order to keep its users stay as longer as possible. It can be concluded that the better the content internet product performs, the more abundant flow it will have; on the contrary, the better the function internet product performs, the fast its users will be lost. We can see clearly that Ali-pay has met the dilemma as the function internet product. How to make its users to do something else or how to improve user activity become the key point to solve the dilemma. Socialization, with its sharing purpose, beyond all doubt, becomes the best the solution for Jack Ma. For example, if someone happens to find another person breaks the traffic law, he or she can take the photo and report it through Ali-pay. Then he or she will get paid for this report and share the news with his or her Ali-pay friends to make money together. Not to mention the ethical or social problems here, we can see how hardly Ali-pay is trying to be socialized.

**Any service designed for socialization on the internet in China should be tightly fit to Chinese tradition and culture.** Why the collection of 5-blessing card and the handing out of WeChat red packets are becoming popular amusement and way of blessing for family members and friends nowadays in China? Because the ideas have been existing for hundreds of years already. Red packet means 'lucky money' in Chinese tradition for Spring Festival. In order to protect the children from being hurt by evils, the elder in the family will use red cord to string the 8 coins and hand out to the children after they pay their respect. When it comes to the Republic of China, people use red envelope to wrap the paper money. That is how red packet come into being. 5-blessing card in Chinese history means five standards for the ultimate happiness of life, which are longevity, wealth, health, love of virtue, and natural death. In modern Chinese society, the standards evolve into the part of the core values of Chinese Socialism, rising from individual perspective to the group points of view. Not to mention the different views on the basic element of society between the west and the east, and different social structure with the context of Chinese culture and other cultures, we can see how advancing Ali-pay is with the environment.

**Smart phone plays the role of 'smart' intermedicator in these scenarios.** On the street of any city in China, you will never find someone scan the character 'Fu' (福) with their laptops or tablets. Undoubtedly, everyone involved in 5-blessing card collection will use its smart phone for many reasons. Among those reasons, there are some quite worthwhile to pay the attention. For example, if some kinds of blessing card you cannot collect by yourself, just ask your families or friends to give you. You can post your needs through WeChat, but you will never have the card unless you also add the one who will give you the card as Ali-pay friend. The good news is you can check all your Ali-pay friends to see how many and what kinds of cards they have already had. Then comes the question: will you trade on Ali-pay or WeChat payment online? Ali-pay will be

mostly chosen answer by Chinese people<sup>1</sup>. It is because that Ali-pay rises together with Alibaba and TaoBao users. The long-term user recognition of trustful payment internet product has been established. You can add new friend in both products, but you have to turn off the button of 'see my updates' and tag the stranger on WeChat such as take-out restaurant owner, delivery courier, taxi driver and so on. You do not need to operate more steps in order to keep yourself safe on the internet when doing the same thing on Ali-pay. Then comes the next question: if your families or friends cannot give you the blessing card you need, what will you do? The common way is to buy online. Then Ali-pay, because of its original function, will have more possibilities to add more real 'strangers' than WeChat. When WeChat, QQ, and other forms of social platform become the way to 'add' more people like you nowadays, Ali-pay does return to the initial purpose of social media. What can be next? Smartphone itself can act differently than usual. It can act as a kind of reminder that tells you when to grab the red packets or who is having the card that you need. It also can react automatically if you download and install some magic small APPs to help you realize all of the above scenarios. In some sense, the smart phone becomes really 'smart'. It can connect people by each other and fulfill the task. It is the smart intermediary between people and different tasks. It helps people to perform some established tasks even without people's firsthand operation. So we can deduce a conclusion that social activities online nowadays have the possibility to be completed by smartphones automatically. It infers that social activities online among people actually are the "social activities" among smartphones or other intelligent products.

## 2 State of the Art

As we can see from the above that if the hardware become socialized among themselves, the object-object interaction and the relationship among them will be inevitably discussed. Will it increase the complexity of object-object interaction? How can it find the other one which provides exactly the service for the benefit of the human beings? How can the relationship among objects be maintained and developed? All these questions lead to the paradigm known as the Social Internet of Things (SIoT). It comes into being when the Social Network meets the Internet of Things<sup>2</sup>.

### 2.1 The Social Network

Starting from the first user of the social network - Justin Hall, student of Swarthmore College, create his 'blog' website in 1994, the history of socialization has been enriched

---

<sup>1</sup> <http://www.chyxx.com/industry/201608/439365.html>.

<sup>2</sup> In the paper of "The Social Internet of Things (SIoT) – When Social Networks meet the Internet of Things: Concept, Architecture and Network Characterization" (*Computer Network*. 2012), Luigi Atzori and his co-authors have clearly reviewed the brief history of SIoT based on existing studies. In China, there is little research on SIoT, and the existing research on SIoT is no more deep than foreign researchers. So how the Social Networks meets the Internet of Things can be found in the above paper. In this article, the author will not explore any more.

by fast-developing technology. Suddenly, the unplanned rise of social media and self-generated content transformed the internet from a bland information platform into a social network. One of the key words of social network is 'share'. Different from the infant stage - SNS, which aims at providing multiple sections of information, not pays attention to individual consciousness, the Social Network provides a vivid stage for individuals to show themselves. Nowadays, comprehensive social communities, vertical social communities focused on specific areas, and social communities with information flow focus appeared one after another. All in all, the most important things behind all is socialization. Socialization is defined as a kind of communicative and connective behavior in social life. If we enlarge the range of targets for socialization, not only human beings, but also objects can be included.

## 2.2 The Internet of Things (IoT)

The Internet of Things integrates a large number of heterogeneous and pervasive objects that continuously generate information about the physical world [1], through unique addressing schemes and standard communication protocols, are able to interact with each other and cooperate with their neighbors to reach common goals [2]. If the Social Network can help people interact with each other, the Internet of Things will help to set up intelligent and communicative relationship between human beings and objects and among objects themselves on the internet.

EU [3] has divided the development of The Internet of Things into three stages: the first stage is to be embedded into consumer electronics applications. It can be regarded as build the skin and five senses of The Internet of Things in order to perceive and collect information. Typical 'things' of this stage are two-dimension code tag and reader, RFID tag and reader, cameras, GPS and so on. The second stage is the application of The Internet of Things in vertical industry. In this stage, the nerve center and the brain of The Internet of Things will be build, which means the network including the communication, management and information processing will be formed. We are now in this stage. Unfortunately, the barriers among different hardware platforms, operational systems, data bases and intermediators have not been overcome yet. The barriers lead to different problems such as high cost of the deployment, lack of information share among different systems and industries, and the waste of time and resources. The last stage of The Internet of Things is the final realization of socialization. In this stage, social division of The Internet of Things has been set-up according to the needs of different industries. A wide range of intelligence has been applied not only based on industry expertise, but also help to share the interest. Eventually a new eco-system will be achieved. This new eco-system of The Internet of Things is the Social Internet of Things.

## 2.3 The Social Internet of Things

As mentioned above, the Social Internet of Things is a new eco-system among intelligent objects. This new eco-system indicates social relationship among objects: every object can look for the desired service using its friendships in a distributed manner. By analysis of the social network structure, which derives from the objects interactions based on the

defined social relationships by human beings, things will be associated to the services they can deliver. In this new eco-system, things will be associated to the services they can deliver within a given social network of objects. The advantages of this new eco-system are navigability, scalable, trustworthiness and openness.

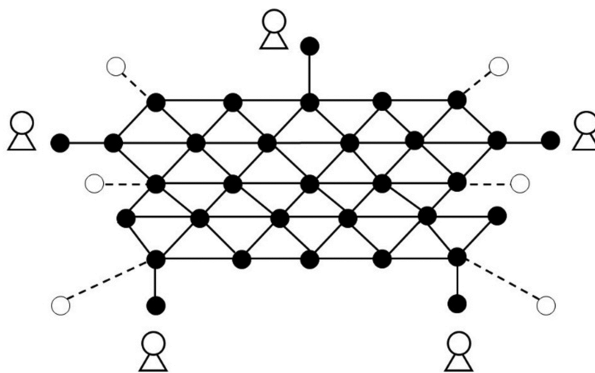
**Navigability.** The Social Internet of Things runs like a human being society. In the system, every object can use its own social relationship to query its friends, the friends of the friends...to find out the most efficient scalable discovery of objects and services.

**Scalable.** During the process of find out the most efficient choice by using the same principles which human beings react in their social networks, each object will find the result in a distributed manner, which guarantees the scale of search.

**Trustworthiness.** in another way of explanation, the usefulness of each object's social relationship. Can the friendship between two objects be trusted? It indicates the fact that each object can autonomously learn, storage and adjust the friendship by each interaction with another object. Just like human beings, object will accumulate inter-object experiences to help itself supplement, correct the 'brain' in order to guarantee the efficiency of next interaction - friendship.

**Openness.** means the system is not closed one, it can be developed by continuous learning of object. In this sense, each object can navigate new object and establish new friendship according to the interest of human beings. What's more, the rules of running the whole system can be the result of participatory design of human beings by using open and shared platform in order to make the system sustainable.

It can be seen that the novel concept of Social Internet of Things (SIoT), based on a sort of social relationship among objects, analogously to what happens for human beings. The Social Internet of Things has the advantages of navigability, scalable, trustworthiness and openness. We also can see that the core issue of the Social Internet of Things is how to make different objects socialized, in another word, how to build the relationship among different objects (Fig. 2).



**Fig. 2.** The visual eco-system of Social Internet of Things

Based on Friske's theory of four elementary relational models<sup>3</sup>, [4] has summarized the following relationships that can be derived in the reference system architecture.

**Parental Object Relationship.** It reflects the homogeneous objects originated in the same period by the same manufacturer.

**Co-location Object Relationship.** It means the relationship among objects used always in the same place or environment. For example, the popular business idea of smart home or smart city.

**Co-work Object Relationship.** It is established whenever object collaborate to provide a common IoT application, that is to say, to fulfill the same task.

**Ownership Object Relationship.** It is established among heterogeneous objects which belong to the same user. For example, a user can own mobile phone, music player, game consoles and other digital appliance at the same time.

**Social Object Relationship.** It is established among objects when different users' devices and sensors can come into contact with each other for social needs.

## 2.4 The Development of the Social Network and the Internet of Things in China

The Social Internet of Things has just in its infant stage of China now or even has not come into being.

The development of the Social Network in China has undergone four stages. The earliest stage is the infant stage, evolving from BBS of Web 1.0 era. The first BBS in China is recorded as 'Shu Guang', including the main functions of releasing the information, internet community, real-time message and chatting room. Tianya, Maopu and Xici Alley, which are still popular nowadays, are the typical examples in this stage. In the second stage, the purpose of the social communities is not to collect and release bunch of information, but for entertainment. Not long after Facebook has established in 2004, Ren Ren community (established in 2005) along with Kai Xin community (established in 2008) become the most popular social communities of this stage and embrace the birth of the Social Network in China in Web 2.0 era. In this stage, videos, articles, questions & answers, and even the encyclopedia become the major information which can be shared and found in the community. Due to time consumption in preparation of online information and lack of real-time feedback of the information, in the third stage, the information online can be cut into very short pieces, normally no more than 140 Chinese characters. The quick feedback and interaction between information provider and reader has summoned up mass users in a very short time. Sina Weibo as a typical example in this stage has successfully helped the Social Network in China draw the attention of capital investment. The fourth stage is called vertical social community.

---

<sup>3</sup> A. P. Fiske. The four elementary forms of sociality: framework for unified theory of social relations. *Psychological review*. Vol. 99, pp.: 689-723. 1992

This kind of the Social Network in China is not the end. It aims at small groups of people who share the same interest on a specific area. The basic logic behind this is to enlarge the concept of the micro-group socialization based on the commercial interest of market customization. These four stages show us the fact of development of the Social Network in China: from copy to self-creation for localization purpose. The rising number of users of the Social Network in China also brings the problems such as online water army, zombie fans, false advertisement and so on.

The development of the Internet of Things in China is quite fast. One typical example is the booming of intelligent home appliances in recent years. Before this wave, Chinese government and information integrator has launched the birth of smart earth, smart city, smart transportation, smart government and information construction of industries. The “Internet Plus” strategy made by Chinese government plays an important role for the development of the Internet of Things in China. From the current situation, R&D manufactures such as Haier, Midea, Changhong, HUAWEI, ZET and internet companies such as Baidu, Ali, 360 and Xiaomi will lead the trend of the market. For example, in 2014, Xiaomi has started to plan its market layout of intelligent home appliances and introduce to Chinese markets several home appliances such as smart TV, Xiaomi box, router and air-cleaner. Thanks to its success in smart phone market, in 2015, Xiaomi has introduced several intelligent home appliances sets to market such as multi-functional gateway, sensors for windows and gates, human sensors, and wireless switch.

### **3 Service Design Strategy**

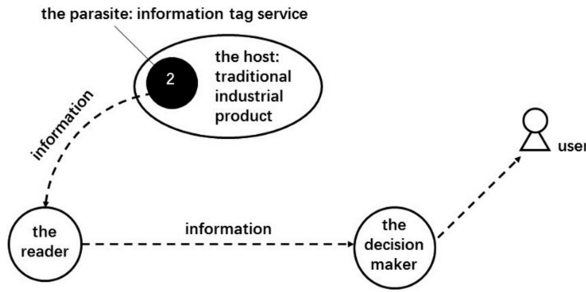
From the review of the basic idea of the Social Network, the Internet of Things, and the Social Internet of Things, we can see that all the foundation of the concepts is the western interpretation of socialization.

From the review of the development of the Social Network and the Internet of Things in China, we can see there are different strategies to establish the social relationship among objects by providing services.

#### **3.1 Assumption 1: Parasitic Strategy**

In biology, parasitism is a non-mutual relationship between species, where one species, the parasite, benefits at the expense of the other, the host. In biology, the host will finally be consumed by the parasite. But in the internet society, the parasitic strategy is just to plant objects such as RFID tag to a certain traditional industry for the purpose of information reading. For example, for a shopping mall, traditional products tagged with RFID card will help it to do the storage check and management. By each reading of individual smart phone with RFID reader, the shopping mall can collect the rough data of popularity of each product. This kind of interaction is taken into place within a certain number of objects. But the relationship between each object is not social at all, it is destined. If one of the object in the system fails, other objects will lose their performances. That is to say, all the objects within this strategy cannot make a choice (Fig. 3).





**Fig. 3.** Parasitic service design strategy

### 3.2 Assumption 2: Interconnected Strategy

This strategy can be seen from many examples of smart home. For example, the smart doorbell nowadays is become more and more popular in Chinese families. The digital camera acts as the guard to capture and record any movement into images before the door and automatically send it to the smart phone of the house owner. The house owner can even talk to the people at the door even when he or she is not at home through the smart doorbell.

Another example is the object-object interaction between Xiaomi scale and Xiaomi smart bracelet. Will the change in weight directly lead to different standard of exercises through the interaction between these two smart products? The answer is ‘No’ at present, but ‘Yes’ in the coming future.

From the first example, we can see how gruffly the data be gathered and sent to the user. The socialization between objects is uncivilized. And the objects remain silent. Even for the smart phone, it is only a tool in this circumstance. And without it, the smart doorbell becomes stupid.

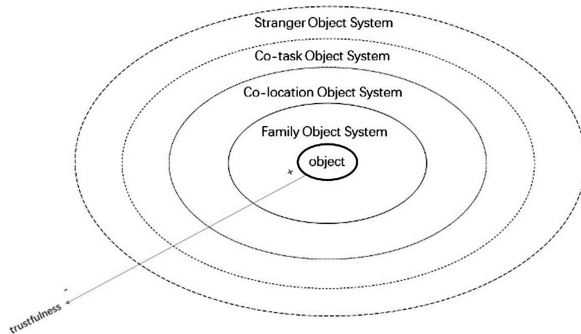
As for the second example, will the scale collect the data of weight and make an analysis? Yes, it is possible. Will the bracelet make the decision for the exercise based on the analysis of the scale? No. It is always the smart phone user who is actually behind all of these objects to make the decisions. The scale and the bracelet only interconnect because of the existence of the smart phone. They cannot make a choice.

But if the big-data model building function can be achieved by the scale or the bracelet through the cloud technology, the objects can understand the user better by better perception and prediction, will the smart phone be replaced? In this sense, the object become really smart to help the users to make some decisions.

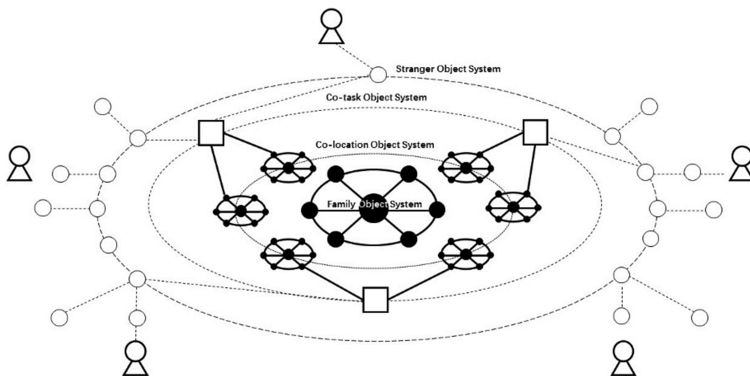
### 3.3 Assumption 3: Symbiosis Strategy

Symbiosis, in Chinese culture, means different people or things can stay with each other in peace. It respects the differentiation, at the same time, emphasizes on the value of concordance among differentiation. It teaches us to look at an object within different systems. These different systems can be seen as the ripple on the water. As shown in Fig. 4, the first level of the object system is family object system. In this system, the

original object can have two roles - as equal as other objects in the family or can be the parental object in the family. Within a given rule or standard, the parental role of the object in the family will guide it to find and discover novel resources to implement the services in the family object system. The second level of the object system is co-location object system. In this system, objects can belong to different families. They have to communicate with each other to build up the trustfulness. Co-location means all these objects are performed in one space. The third level of the object system is co-task object system. In this system, objects find each other and connect to fulfill the same task. The efficiency of compatibility with each other will influence a lot on the relationship among the objects. The fourth level of the object system is stranger object system. This system is full of uncertainty and risks. The degree of trustfulness is weakest in this level. Many exchanges will happen here in order to establish a relationship. From this picture, we can also infer that symbiosis can be achieved easier in the family system. And through different information exchanges, symbiosis can be achieved from broader level of the object system. The picture also indicates that each object system belongs to a boarder object system. Radical innovation normally happened easily to an object, but gradual innovation should be achieved by the whole system. The real purpose of symbiosis is



**Fig. 4.** Symbiosis strategy of an object interpreted by the form of the ripple



**Fig. 5.** Symbiosis service design strategy for SIoT

to enhance the value of the whole system by information exchanges among different objects and object systems to build up the relationship. Then the objects within the system become really smart and self-developed, which echoes the nature of the Social Internet of Things (Fig. 5).

## 4 Conclusion

It is hard to tell whether there is a period in history as bustling as today. Especially in China, Chinese people has experienced fast iteration of lifestyles within 30 years. The Social Network and the Internet of Things seem to invade their lives. And the combination of them will be more evolutionary. It is not a product, or a kind of technology, or a website, or an App to be redesigned. It is actually not the problem of design; it is the birth of a new eco-system which make different objects become socialized.

From Assumption 1-parastic strategy, we can see that it is not the right service design strategy for SIoT. From Assumption 2-interconnected strategy, we can see that the objects in the system are not smart at all and they cannot be socialized with each other without the help of some key technologies such as big data. Neither the former two strategies have considered about the context of SIoT's application. Considering Chinese culture and tradition, the Assumption 3-symbiosis strategy is much closer to what Chinese behave in the Social connection. So the services designed to achieve symbiosis in social connection will be the strategy for the Social Internet of Things in China considering its cultural and traditional context.

## References

1. Nitti, M., Atzori, L., Cvijikj, I.P.: Friendship selection in the social internet of things: challenges and possible strategies. *IEEE Internet Things J.* **2**(3), 240–247 (2014)
2. Sarma, S., Brock, D., Ashton, K.: The networked physical world: proposals for the next generation of computing commerce, and automatic identification. AutoID Centre White Paper (1999)
3. Hequan, W.: Things will eventually perceive the society. *Machine Design and Manufacturing Engineering* (2012)
4. Atzori, L., Iera, A., Morabito, G.: The Social Internet of Things (SIoT)-when social networks meet the internet of things: concept, architecture and network characterization. *Comput. Works* **56**, 3594–3608 (2012)
5. Hu, J.: Social things: design research on social computing. In: Rau, P.-L.P. (ed.) CCD 2016. LNCS, vol. 9741, pp. 79–88. Springer, Cham (2016). doi:[10.1007/978-3-319-40093-8\\_9](https://doi.org/10.1007/978-3-319-40093-8_9)
6. Atzori, L., Iera, A., Morabito, G.: SIoT: giving a social structure to the internet of things. *IEEE Communications Letters* (2011)
7. Kranz, M., Roalter, L., Michahelles, F.: Things that twitter: social networks and the internet of things. In: What Can the Internet of Things Do for the Citizen (CIoT) Workshop at the Eighth International Conference Pervasive Computing (2010)
8. Yonghua, L.: 30 years of the social network in china: free connection among people. *The Internet Economy* (2015)
9. Atzori, L., Iera, A., Morabito, G.: From 'smart objects' to 'social objects': the next evolutionary step of the internet of things. *IEEE Internet Things J.* **52**, 97–105 (2014)