



LAPIN YLIOPISTO  
UNIVERSITY OF LAPLAND



**University of Lapland**

**This is a self-archived version of an original article. This version usually differs somewhat from the publisher's final version, if the self-archived version is the accepted author manuscript.**

## **Opportunities to improve the user experience of package delivery services in Northern Finland through AI (Siri)**

Suoheimo, Mari; Raudanjoki, Özge; Beaulé, Caoimhe; Laitinen-Tolonen, Aulikki

Published: 01.09.2019

### *Document Version*

Publisher's PDF, also known as Version of record

### *Citation for published version (APA):*

Suoheimo, M., Raudanjoki, Ö., Beaulé, C., & Laitinen-Tolonen, A. (2019). *Opportunities to improve the user experience of package delivery services in Northern Finland through AI (Siri)*. 1-8. Paper presented at IASDR WORLD CONFERENCE ON DESIGN RESEARCH, Manchester, United Kingdom.  
<https://iasdr2019.org/research-papers>

### **Document License**

Unspecified

# Opportunities to improve the user experience of package delivery services in Northern Finland through AI (Siri)

Suoheimo, Mari\*<sup>a</sup>; Raudanjoki, Özge<sup>a</sup>, Beaulé, Caoimhe Isha <sup>a</sup>, Laitinen-Tolonen, Aulikki<sup>b</sup>

<sup>a</sup> University of Lapland, Rovaniemi, Finland

<sup>b</sup> Lapland University of Applied Sciences, Rovaniemi, Finland

\* msuoheim@ulapland.fi

This short paper studies how package delivery could be assisted by AI. Three customer journeys were performed to understand the pain points and the opportunities related. The mapped journeys reveal how Siri is currently limited and still not able to do interaction with humans as humans interact with each other. It is able to do just simple commands and struggles with more complex issues as making the transactions or interacting with an online website. The study confirms Bellagarda's (2013) statements on how AI could assist in three domains as interlinking the user's personal information, integration of the virtual assistant (Siri) with across domains and be capable of doing transactions. Siri has great potential in improving package delivery service as through linking the online calendar of the client with the service; it could take the role of a secretary. The participants were all located at the northern part of Finland.

**Keywords:** *User Experience; Service Design; Customer Journey; Siri & Artificial Intelligence; Delivery Services; Remoteness*

## 1. Introduction

Like most countries around the globe, most sectors in Finland are increasingly becoming digitized. Nonetheless, the country struggles to deliver mail and packages to remote areas like Lapland (Aimo-Koivisto, 2019; Hietala, 2019; Hiltunen 2019). These areas could perhaps benefit from digitized services and take advantage of the rapidly changing service systems. The influence of e-markets has, for example, created challenges in securing mail delivery and printed newspapers (Posti Proposed Solutions, 2019). To address these changes, postal and media industries are progressively switching to digital means. Moreover, the gradual migration of rural populations to larger bigger urban centers cities decreases the offering of the delivery services in the Northern regions area (Ahola, 2016; Pölkki & Saarinen, 2017). Beyond the complexities relating to remoteness, delivery services in these areas are regularly affected by extreme winter conditions, like ice and snow collecting on trucks (Rontti et al., 2018). All in all, these issues can create negative user experiences within delivery services in Northern Finland, especially when one relies on the effectiveness of the service to receive important mail. The need to address these issues, especially from the perspective of mobility and logistics, has been highlighted by recent funding calls in Finland<sup>1</sup>. Could Artificial Intelligence (AI) personal assistants play a role in improving delivery service experiences for all Finnish inhabitants? According to Bellagarda,

---

<sup>1</sup> For example, Business Finland's *Smart Mobility* sector and EAKR regarding regional development, and particularly within the Lapland and Eastern Finland areas.

artificial intelligence and personal assistants such as Siri can be integrated into online services, but progress is needed in these three areas:

*[a] a deep integration within the operating system, so as to leverage user-level information such as contact, calendar, email, and other personal data; [b] an integration of assistant capabilities across domains, to enable potential coreference resolution and leverage any other temporary context state; and [c] a broad integration with a variety of web services, to offer an appealing palette of utility and support successful transactions in the selected domains. (Bellagarda, 2013, p. 2031)*

This short study seeks to identify opportunities to improve the experience of Lapland delivery service users through AI personal assistants and shed light on what Bellagarda (2013) mentions regarding the needs of development in these fronts. The research is of exploratory nature and seeks to identify current limits, and potential areas to further be explored within design research, but also for companies and actors within the delivery service systems. The main questions guiding this paper are:

- What are the problems and opportunities relating to the experience of package delivery services in Northern Finland?
- How can Siri currently be used to improve a delivery service experience in Northern Finland, and what are its limits?

The objectives of this paper will be to identify opportunities for AI regarding the improvement of delivery services in Finland, in order to deserve all its citizens (i.e. outside the most densely populated areas). The data was collected through auto-ethnographic customer journeys, documenting delivery experiences by the researchers in Rovaniemi and Oulu (Finland). Hence, the data collection was conducted by mapping the current experience of using Siri in this particular context. Furthermore, it seeks to discuss the general potential benefits of using AI in package delivery service design.

## **2. Methodology**

The epistemology of the research is pragmatic, as it starts from 'action' and how knowledge is created through action (Kilpinen, 2008). As mentioned by Kilpinen (2008), the action comes through the journeys that the subjects perform in relation to the "world", in this case, of package service delivery. It is also exploratory as it starts from a problem perspective and wants to discover something new and interesting (Swedberg, 2018). Swedberg (2018) advances that, when the topic is not new and study aims to create more knowledge on a known field. The assumption is that there is potential for AI to assist package delivery services and can help to create a seamless service in customer experience. This study seeks to also verify or clarify what is the knowledge in relation to AI as online assistant. The study uses qualitative analysis by mapping three user's service experience through auto-ethnographic customer journey mapping.

Auto-Ethnography "builds on personal experience" and it tells stories in the social contexts (Reed-Danahay, 2017, p. 146). According to Adams and his colleagues "autoethnographers also describe moments of everyday experience that cannot be captured through more traditional research methods" (Adams et al., 2017, p. 4). Autoethnography is a method that humanizes research (Adams et al., 2017). In this particular case, the form of

autoethnography (or self-ethnography/ documentation) is used as defined within basic service design tools. These take the form of field notes, recordings and photographs. In contrast to “real” academic autoethnographic research (where a researcher would immerse oneself into an organization for multiple months), service designers regularly use a smaller version of this to immerse themselves in real life situations to better understand them (Stickdorn, 2018). In this research three authors of this paper are the autoethnographers and the research was done as an assignment of a doctoral service design course.

Moreover, Solis (2015) indicates that journey maps bring customers’ needs into focus in order to serve them better through technological and strategic solutions. User’s experiences are affected by the service encounters (touchpoints), which work for the users (magic moments) and parts needing to be developed (pain points), that together form the complex user journey where people, information, products and spaces are identified (Vakulenko et al., 2019; Design Council, 2015). The customer journey map consists several touchpoints where only some are under firm’s control (Trischler et al., 2018). Forming the experience “pre-core” and “post-core” encounters are as significant as the core service encounter (Vakulenko et al., 2019, p 2.). Experience maps help to focus on the emotional part of customer journey by indicating what are the highs and the lows during their engagement, and including time, place, devices that they are attached to service and channel (Solis, 2015, p. 145).

### **3. Data of Mapping Three Customer Journeys**

In total, there were three customer journeys mapping the user-experience of ordering a package; the users filled out a questionnaire in order to better understand the sample of this study. The questionnaire summarized their profiles and provided preliminary information regarding the users’ previous experiences with Siri. According to the preliminary questionnaire results, their previous experiences and competencies of using digital devices were relatively similar. The ages of participants varied between 28 and 35. The results revealed each participant used different iOS devices. Siri was selected since all the three autoethnographers were already using it and had iOS and MacOS operating system based mobile phones or computers. None of the users were native English speaker, but they preferred to use Siri in English. According to the results of the questionnaire, most of the participants find Siri practical and easy to use for basic tasks. On the other hand, the participants also stated that some of the features are still limited and it demands too much effort.

The packages in question were ordered from both local and international suppliers. First, the three users were asked to note all steps, events, in the user journey from the moment they ordered their package, up to the moment they received it, as well as their emotional state and thoughts in each section. Secondly, the users were asked to explore how Siri could assist in the process of delivering online shopping during the phase of package delivery, and identify its current limits. The data set comprised digital texts, screenshots, and notes the process of delivering online shopping during the phase of package delivery. All these details were added to individual customer journey excel files, which were then used for investigation and to identify the general observations and results of this study.

The users were asked to try to use Siri during the whole process of checking out on an online store until picking up the packet if it was possible. The Table 1 shows more in detail what areas the users were asked to document. The users could adapt it according to their journey. The study does not concentrate on the voice-based interaction or Siri as an input

method as such but more how Siri can enable the shopping experience to work better during the whole process of a customer journey.

Table 1 Customer journey template.

	1. Check Out	2. Giving Address	3. Selecting the way to send the packet	4. Payment	5. Communication of the payment	6. Communication of the tracking	7. Communication of the arrival	8. Picking up
Date:								
Weather every single day:								
Specify the device used:								
PRINT SCREEN OF THE MOMENT								
WHAT DID YOU ASK SIRI?								
HOW DID IT HAPPEN? (SIRI)								
SIRI Was Siri implemented yet? How? Did it work?								
I FEEL What the service experience made me feel at each stage?								
I SHOULD FEEL What it should have been?								
PAINPOINTS What were the painpoints encountered?								
SOLUTIONS & OPPORTUNITIES								

Source: Authors.

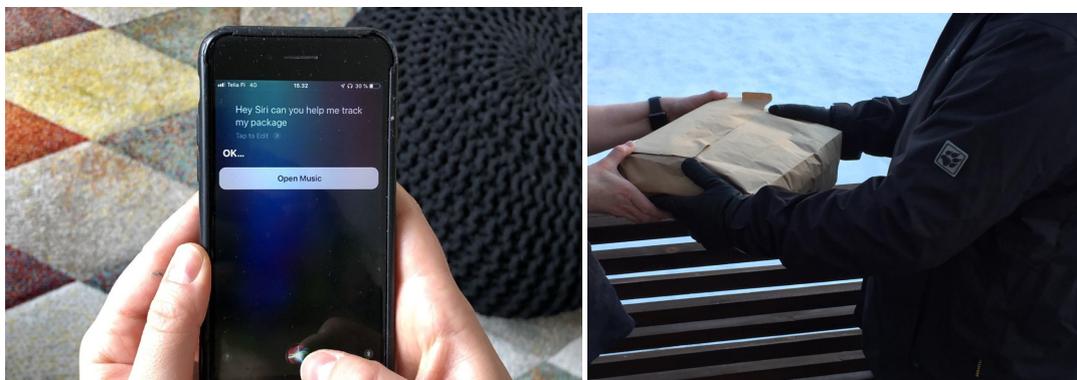


Figure 1 & 2. Users were asked to try using Siri in all possible steps. Receiving the package. Source: Authors.

### 3.1 Observations of the Customer Journeys

In order to compare the differences between the experiences of users, all stages of the process were examined by combining them into a single visual map to better observe the overall experiences (see figure 3 & 4). In this map, the users first examined their general delivery experiences and emotional journey.

According to the research data, during this stage of the process, all users had an overall positive experience. Then, the users investigated the same process in terms of the advantages and disadvantages of using Siri in the package delivery process. In addition, the questionnaire data shows that the participants' previous experiences and expectations in using Siri were similar to each other. However, U1 and U3's feelings of using Siri in complicated issues was frustrating. On the other hand, U2 indicated that although Siri was unable to perform some of the complex tasks, not all of them. In this sense, U2 had time to perform tasks with Siri more intensively by using alternative methods during the same process and as a result of this U2 had a slightly better experience.

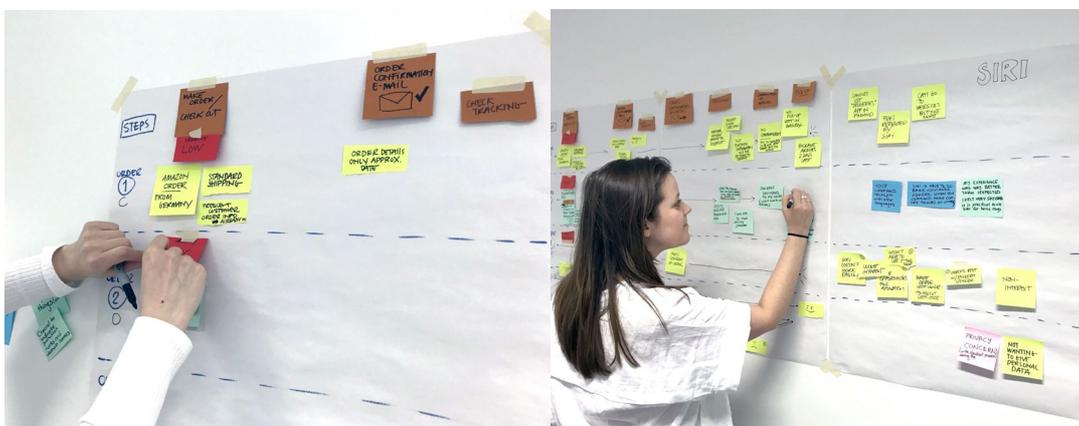


Figure 3 & 4. Mapping the observations documented by user 1,2 & 3. Source: Authors.

According to the analysis of the three customer journeys, all the participants had a relatively good experience in receiving the packages. During this process, User1 (U1) indicated that the package did not arrive on estimated arrival time and information regarding the delay was not accessible. In contrast to U1, User2 (U2) had a slightly different experience during the same process. In this case, the package was delivered far earlier than estimated delivery time, however, online information regarding the estimated arrival time of the package was contradictory with the actual time. User3 (U3) and U2 received a locker code as an electronic phone message and handled the package from the located pickup point with the locker code sent by Posti national delivery service as SMS (short message service). All users experienced tracking through various email communications as well as through online tracking webpages. One user had a 'medium' urgent package to receive, while the other two had non-urgent packages. The three journeys also mapped the local weather each day. Although the weather in Northern Finland can definitely impact the efficiency and speed of deliveries, the weather conditions were not considered as a conclusive element in this study. U1 had suspected severe snow storm could have impacted the delivery of the shipping but was not able to confirm this claim. Users were assigned different tasks in each step of the research process, which included: ordering a product, making payment and adding shipping details. While performing the initial tasks, two of the users became discouraged or uninterested to explore other ways of using Siri after the first attempts were unsuccessful.

In addition, security issues emerged during computer use to enable Siri to use an autofill function in payments. Although the U3 authorized Siri to autofill addresses and personal information Siri was unable to proceed with the task. U3 also took over the Siri during the

payment phase as she knew that it would be unable to cover this task. Actually, none of the users were able to use Siri during the payment part of the delivery. In the customer journey, U1 mentioned being disappointed to not have been able to use the deliveries application which is developed for service systems in the U.S.A.

On the other hand, throughout the research process, users observed that Siri was not able to recognize non-English words at the first attempt. For example, when U3 asked Siri was to open a store called *Matsmart*, Siri responded: "It does not look like you have an app named my dad smart". The language barrier complicates the user situation. However, U2 indicated that when spelling out foreign domain addresses or coding the direct links letter-by-letter, including the punctuation marks, Siri led to successful results. Moreover, during this process, U2 noticed that pronunciation modus, commanding velocity and command sequence have also a critical effect in interacting with Siri. This user also indicated that the usage of external apparatus such as headphones has a positive effect in terms of word recognition accuracy.

## **Discussion and Conclusion**

The research presented in this paper prefaces the need for using an artificial digital assistant (Siri) in delivery services. To reach this goal, the authors explored how package delivery could be assisted by AI. This paper summarized the author's customer journey experiences. The authors explored the use of Siri in package delivery and evaluated the deficiencies and benefits of using an artificial digital assistant during the delivery process. The data analyzed from three participants showed that although there are significant limitations of using Siri in package delivery, Siri can perform basic commands and assist users in certain tasks, but struggles with more complicated ones as with payments.

Siri could assist users in performing introductory tasks and could be used as an intermediary tool in performing some of the more complex tasks during the package delivery process. Siri reveals great potential in improving user experience and the current deficiencies can be overcome in the near future. For instance, it could take the role of a personal secretary and combine the delivery time with the user's online calendar, or inform the user on the progress of the shipment. According to the data collected, Siri is still pretty far from interacting with the users as humans interact with humans what Saad and his colleagues have proposed (2017).

The results of the analysis of three customer journeys follow the assumption that the artificial intelligence could have potential in creating a seamless service in customer experience in package delivery for following four categories: (1) making an order, (2) paying the order (3) tracking, (4) picking it up. This answers to the assumption made previously in the paper. The Siri has potential, but today is unable to deliver totally seamless service in the four areas. These answers verify the points that Bellargarda (2013) has pointed out: Siri ought to be enabled to use customer's personal information, integrate across domains and support transactions

This short paper is unable to identify the relation of the local weather to the package delivery due to the small data amount. Nonetheless, it could be an interesting topic to explore further, and see how AI advancement could potentially improve the general experience of package delivery for Northern and remote areas in Finland, specifically during the winter season. The service could be more accurate and transparent regarding the delivery and how the weather influences in it. Sensor technologies and machine learning could be an aid in this as there are plenty of weather sensor and open data available. This data could be brought to the services. As the delivery was made to remote area of Finland, the delivery service could be

more transparent in the terms when packets delay, what is the reason of the delay. As an example, weather is a common cause in the northern region especially in winter time that could affect the delivery service? There are already a lot of weather sensors on the roads or in the air that could be connected to the service through artificial intelligence and machine learning to improve the current services to be more transparent.

The study seems to support the idea that Siri can be an effective tool in delivery services, but further research is needed in order to draw more precise conclusions. Although users investigated significant limitations of using Siri at different stages of the research, they could be improved in the near future. Further research would be needed to explore how new technological development could positively impact delivery service experience. This requires more cross domains collaboration among the different stakeholders in order to explore the opportunities offered by these emerging technologies regarding life in Northern and remote regions.

#### 4. References

- Ahola, O. (2016, September 18). Suomessa on käynnissä uusi "suuri muutto" – tästä syystä kaupunkeihin kaivataan vauraita [There is a new "big move" in Finland - that's why the city needs wealthy people]. *Aamulehti*. Retrieved April 18, 2019, from <https://www.aamulehti.fi/kotimaa/suomessa-on-kaynnissa-uusi-suuri-muutto-tasta-syysta-kaupunkeihin-kaivataan-vauraita-23923017>
- Aimo-Koivisto, A. (2019, January 23). Posti esittää valtiontukea paperilehtien jakeluun maaseudulla – perusteena "moniarvoisen tiedonvälityksen turvaaminen" haja-asutusalueilla [Post presents state aid for the distribution of paper leaflets in rural areas - as a basis for "safeguarding communication pluralism" in sparsely populated areas]. *Talous*. Retrieved April 18, 2019, from <https://www.ess.fi/uutiset/talous/art2514266>
- Bellegarda, J. R. (2016). Large-Scale Personal Assistant Technology Deployment: The Siri Experience. *9th ISCA Speech Synthesis Workshop, 2029-2033*. doi:10.21437/ssw.2016
- Hietala, A. (2019, January 8). "Ei ollut tasapuolista" – Posti lopettaa kuitattavien lähetysten kotiinkuljetuksen maksutta myös haja-asutusalueilla, Näätämöstä matkaa lähipostiin 150 kilometriä ["There was no equality" - Posti will stop delivering receivables for home delivery free of charge also in sparsely populated areas, closest Posti is 150 kilometers from Näätämö]. *Lapin Kansa*. Retrieved April 18, 2019, from <https://www.lapinkansa.fi/lappi/ei-ollut-tasapuolista-posti-lopettaa-kuitattavien-lahetysten-kotiinkuljetuksen-maksutta-myos-haja-asutusalueilla-naatamosta-matkaa-lahipostiin-150-kilometriä-200647673/>
- Hiltunen, V. (2019, January 12). Harvaan asutun maaseudun verkosto vaatii Postia perumaan päätöksensä – "Pakettien satojen kilometrien noutomatka on kohtuuton" [A sparsely populated rural network demands Posti to overturn its decision - "The hundreds of kilometers of the package picking is unreasonable"]. *Lapin Kansa*. Retrieved April 18, 2019, from <https://www.lapinkansa.fi/lappi/harvaan-asutun-maaseudun-verkosto-vaatii-postia-perumaan-paatoksensa-pakettien-satojen-kilometrien-noutomatka-on-kohtuuton-200665428/>
- Kilpinen, E. (2008, June). Pragmatism as a Philosophy of Action. In *First Nordic Pragmatism Conference, Helsinki, Finland*.
- Posti's proposed solutions for decision makers to secure delivery in the 2020s: Fixed-term State aid for printed newspapers in rural areas, the renewal of postal regulation should be continued. (n.d.). Retrieved April 18, 2019, from [https://www.posti.fi/private-news/english/current/2019/20190123\\_Postis\\_proposed\\_solutions.html](https://www.posti.fi/private-news/english/current/2019/20190123_Postis_proposed_solutions.html)
- Pölkki, M., & Saarinen, J. (2017, December 30). Kuolevien kylien maa – HS:n erikoisartikkeli kertoo tuhannen kadonneen kylän tarinan ja sen, miksi poikamies Arto Voutilaisella on oma pisteensä kartalla. *Helsingin Sanomat* [The Land of Dying Villages - The Special Feature of HS says the story of a thousand lost villages and why the bachelor Arto Voutilainen has his own point on the map]. Retrieved April 18, 2019, from <https://dynamic.hs.fi/2017/katoavatkyilat/a>

- Reed-Danahay, D. (2017). Bourdieu and critical autoethnography: Implications for research, writing, and teaching. *International Journal of Multicultural Education*, 19(1), 144-154.
- Rontti, S., Ahola, S., Miettinen, S., & Ahola, S. (2018). *Arctic Truck Platooning Challenge: Investigating Arctic Challenges of Road Transport* (pp. 1-16, Rep.). Rovaniemi, Lapland: University of Lapland.
- Saad, U., Afzal, U., El-Issawi, A., & Eid, M. (2017). A model to measure QoE for virtual personal assistant. *Multimedia Tools and Applications*, 76(10), 12517-12537.  
doi:<http://dx.doi.org.ezproxy.ulapland.fi/10.1007/s11042-016-3650-5>
- Solis, B. (2015). *X: The experience when business meets design*. John Wiley & Sons.
- Stickdorn, M., Hormess, M. E., Lawrence, A., & Schneider, J. (2018). *This Is Service Design Doing: Applying Service Design Thinking in the Real World*. " O'Reilly Media, Inc."
- Swedberg, R. (2018). On the Uses of Exploratory Research and Exploratory. In J. Gerring, C. Elman, J. Mahoney (Ed.), *Producing Knowledge*. (Forthcoming).
- Trischler, J., Zehrer, A., & Westman, J. (2018). A designerly way of analyzing the customer experience. *Journal of Services Marketing*, 32(7), 805-819.
- Vakulenko, Y., Shams, P., Hellström, D., & Hjort, K. (2019). Service innovation in e-commerce last mile delivery: Mapping the e-customer journey. *Journal of Business Research*.  
doi:[10.1016/j.jbusres.2019.01.016](https://doi.org/10.1016/j.jbusres.2019.01.016)

#### About the Authors:

**Mari Suoheimo:** is a Ph.D. candidate at the Culture-based service design Doctoral program. She has been facilitating the service design process in the European Union (ESR) funded Voitto-project and currently the Cross-Border Mobility in the Barents region.

**Özge Raudanjoki:** is a doctoral candidate in Culture-based service design program at the University of Lapland and continues to pursue her studies in new media design and production program at Aalto University. Her research focuses on unconventional forms of interaction through digital media tools.

**Caoimhe Isha Beaulé:** is a multidisciplinary designer and researcher from Montréal (CA), pursuing doctoral studies in Culture-based service design at the University of Lapland, Finland. Her current research revolves around exploring the role design in individual and community development in Northern regions and winter cities.

**Aulikki Laitinen-Tolonen:** received her M.Sc. (International Relations) degree from University of Tampere and MBA (International Business) from Aalto University (previous Helsinki School of Economics and Business Administration). She is currently working as Senior Lecturer in Lapland University of Applied Sciences

**Acknowledgement:** This research was supported by the Co-Stars Service Design Research Group, University of Lapland, Rovaniemi, Finland. Mari Suoheimo would like to show gratitude to the Lapland Regional Fund of the Finnish Cultural Foundation for their one-year grant for her Ph.D. research.