

## 5 Virtual Assistants: artificial intelligence at your service

---

### The leap from apps to conversational interaction

**Advances in artificial intelligence are enabling the development of virtual assistants that mediate our relationships with resources accessible via the Internet, making life easier and changing the way we interact with businesses and services.**

A virtual assistant is a piece of software that interacts with users through natural language (written or spoken) in specific environments, providing information or services contextually, just as a human assistant would. Often, in an attempt to establish a closer relationship with the user, they are represented by human avatars and given a name.

In their first stage, these assistants were limited to providing a friendlier interface than the usual question and answer databases. This is the case of Anna, IKEA's virtual assistant, one of the first tools of this type, and one which has been in service for 10 years.

The advance of technologies related to general artificial intelligence (deep learning, neural networks and natural language processing) and conversational systems (interactive voice response and voice recognition) enable the development of agents that channel all network-based user interaction, responding to all needs, more smoothly than apps can. The use of voice as an interface in the relationship between people and machines is the next step. [Alexa](#), the Amazon assistant, is always connected and listening through the [Echo](#) device; it can consult a recipe, control the music you're listening to and handle the heating thermostat following voice instructions. Alexa handles all applications with simple commands in natural language, and can discern which application it should use in each case (if you say, "turn up the volume" it understands that you mean Spotify and that "raise the temperature" refers to the thermostat). Customers of neobanks [N26](#) and [Monzo](#) can ask Apple's assistant [Siri](#) to perform financial transactions, such as transferring money between accounts, and [Capital One](#) can pay bills and check your statements using Alexa.

Internet giants are investing in these artificial intelligence tools, as evidenced by their movements this year around conversational platforms: in March [Microsoft](#) announced its chatbot, a virtual assistant that communicates with users through written text; in April, [Facebook](#) launched the implementation of chatbots in Messenger, allowing users to make reservations or purchases more easily; in May, [Google](#) announced its virtual voice assistant and [Amazon](#) made its assistant Alexa accessible without the need for the Echo device; and in June [Apple](#) opened iMessage to integrate third-party services. With all the great players in the game and a growing number of start-ups in this ecosystem, the trend towards conversational interaction seems to be reasserting itself. In addition to developing their own virtual assistants, these big companies open their platforms for the development of chatbots by third parties (equivalent to the app stores model), expanding the number of services that consumers can interact with through their assistants. The integration of services through voice-controlled assistants and messaging platforms may be the end of the app explosion, the latter are often downloaded and used only once.

As an alternative to voice interaction, the growing popularity and great scope of mobile messaging tools (the four major platforms total over 3,000 million users) are giving impetus to chatbots, especially in mobile communications. Users find these chatbots more user-friendly than apps (no need to download and access them), and they are also cheaper for companies to develop and maintain than apps are, especially those whose intelligence is simpler (based on machine learning instead of deep learning). In China, [WeChat](#) is more than a messaging tool: its more than 700 million users can buy, pay and check their bank accounts through messages, the main means of access to the web for many of them, instead of search engines. Although the preference for messaging is clear among young people, voice interaction with devices is

becoming consolidated and Google indicates that twenty percent of visits on mobile platforms are made by voice<sup>21</sup>.

In the financial world, the main functions that these bots can carry out are basic transactions, resolution of the most frequent queries in call centres and the possibility of opening conversations that are channelled to the sales force or human assistance. There are also numerous internal tasks in companies for which these wizards can be used, providing access to complex information, and carrying out routine tasks. The Royal Bank of Scotland is using Watson, IBM's cognitive platform, to develop [Luvo](#), a tool that helps employees who assist companies, while learning from its users actions. Using devices that are voice-activated by employees can expedite access to information, generating significant cost savings.

Some data give us an idea of the potential of these tools:

- According to Tractica the consulting company, the profits generated by the Digital Virtual Assistants market will grow from 1,600 million dollars in 2015 to 15,800 million in 2021<sup>22</sup>,
- Over 11,000 chatbots have been developed on Facebook Messenger and 23,000 developers have registered<sup>23</sup>. According to Business Insider, if Facebook can monetize Messenger in the same way as Apple has monetized its Apple Store, it could generate 32,000 million dollars in profits for developers and Facebook itself<sup>24</sup>.
- Gartner predicts that by 2019 this technology will be used as the primary interface for connected domestic services in at least 25% of households in developed countries<sup>25</sup>.

One of these tools' main strengths is their ability to learn: if they do not know the answer, they resort to human assistants, and incorporate the answers into their knowledge base. Another example of this tool's technological progress is its ability to operate on devices like mobile phones, without the need for a supercomputer. The capability to recognise speech and emit messages is becoming ever closer to human standards (with a success rate of 90%), often making it impossible for the consumer to discern whether he or she is talking to a machine or a human assistant, although natural language processing remains a major challenge.

However, although the response to specific interactions such as ordering a pizza or booking a car is good, machines alone do not yet provide a satisfactory user experience in advising on or solving complex problems, especially if the machines are not dedicated to a single service. Many banks are committing to chatbots or integrating queries and operations in conversational platforms, but advisory work requires further development of the capabilities of artificial intelligence. Some bank assistants are already part of this new generation, such as [MyKai](#), the wizard developed by Kasisto, which not only helps customer transactions through Facebook and Slack, but understands complex questions, and is closer to General Artificial Intelligence.

To achieve a real conversation with customers, we must not only have technology but, above all, correct treatment of data in real time which, for many financial institutions burdened by old technology platforms, should be the first step in their evolution toward intelligent virtual assistants.

---

21: [Google Mobile Voice Study](#), cited by Search Engine Land, 18 May 2016

22: [The Virtual Digital Assistant Market Will Reach \\$15.8 Billion Worldwide by 2021](#), Tractica Press Release, 3 August 2016

23: [eContext's White Paper Explores the Benefits of Structured Knowledge](#), Business Wire, 28 July 2016

24: Beaver, Laurie (2016), [The chatbots explainer](#), Business Insider Intelligence

25: [Gartner Says Digital Assistants Will Serve as the Primary Interface to the Connected Home](#), Gartner Newsroom, 20 June 2016

**DISCLAIMER**

This document has been prepared by BBVA Research Department, it is provided for information purposes only and expresses data, opinions or estimations regarding the date of issue of the report, prepared by BBVA or obtained from or based on sources we consider to be reliable, and have not been independently verified by BBVA. Therefore, BBVA offers no warranty, either express or implicit, regarding its accuracy, integrity or correctness.

Estimations this document may contain have been undertaken according to generally accepted methodologies and should be considered as forecasts or projections. Results obtained in the past, either positive or negative, are no guarantee of future performance.

This document and its contents are subject to changes without prior notice depending on variables such as the economic context or market fluctuations. BBVA is not responsible for updating these contents or for giving notice of such changes.

BBVA accepts no liability for any loss, direct or indirect, that may result from the use of this document or its contents.

This document and its contents do not constitute an offer, invitation or solicitation to purchase, divest or enter into any interest in financial assets or instruments. Neither shall this document nor its contents form the basis of any contract, commitment or decision of any kind.

In regard to investment in financial assets related to economic variables this document may cover, readers should be aware that under no circumstances should they base their investment decisions in the information contained in this document. Those persons or entities offering investment products to these potential investors are legally required to provide the information needed for them to take an appropriate investment decision.

The content of this document is protected by intellectual property laws. It is forbidden its reproduction, transformation, distribution, public communication, making available, extraction, reuse, forwarding or use of any nature by any means or process, except in cases where it is legally permitted or expressly authorized by BBVA.

This report has been produced by the Digital Regulation Unit:

**Chief Economist for Digital Regulation Unit**

Álvaro Martín  
alvaro.martin@bbva.com

María Álvarez  
maria.alvarez.caro@bbva.com

Ana Isabel Segovia  
ana.segovia@bbva.com

Vanesa Casadas  
vanesa.casadas@bbva.com

Pablo Urbiola  
pablo.urbiola@bbva.com

Alicia Sánchez  
alicia.sanchezs@bbva.com

Javier Anatole Pallás Gozávez  
javieranatole.pallas@bbva.com

Javier Sebastián  
jsebastian@bbva.com

*With the contribution of:*

Alfonso Arellano Espinar  
alfonso.arelano.espinar@bbva.com

Noelia Cámara  
noelia.camara@bbva.com

## BBVA Research

**Group Chief Economist**

Jorge Sicilia Serrano

**Macroeconomic Analysis**

Rafael Doménech  
r.domenech@bbva.com

*Global Macroeconomic Scenarios*

Miguel Jiménez  
mjimenezg@bbva.com

*Global Financial Markets*

Sonsoles Castillo  
s.castillo@bbva.com

*Global Modelling & Long Term Analysis*

Julián Cubero  
juan.cubero@bbva.com

**Innovation & Processes**

Oscar de las Peñas  
oscar.delaspenas@bbva.com

**Financial Systems & Regulation**

Santiago Fernández de Lis  
sfernandezdelis@bbva.com

*Countries Coordination*

Olga Cerqueira  
olga.gouveia@bbva.com

*Digital Regulation*

Álvaro Martín  
alvaro.martin@bbva.com

*Regulation*

María Abascal  
maria.abascal@bbva.com

*Financial Systems*

Ana Rubio  
arubiog@bbva.com

*Financial Inclusion*

David Tuesta  
david.tuesta@bbva.com

**Spain & Portugal**

Miguel Cardoso  
miguel.cardoso@bbva.com

**United States of America**

Nathaniel Karp  
Nathaniel.Karp@bbva.com

**Mexico**

Carlos Serrano  
carlos.serrano@bbva.com

**Middle East, Asia & Geopolitics**

Álvaro Ortiz  
alvaro.ortiz@bbva.com

**Turkey**

Álvaro Ortiz  
alvaro.ortiz@bbva.com

**Asia**

Le Xia  
le.xia@bbva.com

**South America**

Juan Manuel Ruiz  
juan.ruiz@bbva.com

**Argentina**

Gloria Sorensen  
gsorensen@bbva.com

**Chile**

Jorge Selaive  
jselaive@bbva.com

**Colombia**

Juana Téllez  
juana.tellez@bbva.com

**Peru**

Hugo Perea  
hperea@bbva.com

**Venezuela**

Julio Pineda  
juliocesar.pineda@bbva.com

### Contact details:

Azul Street, 4  
La Vela Building - 4 and 5 floor  
28050 Madrid (Spain)  
Tel.: +34 91 374 60 00 and +34 91 537 70 00  
Fax: +34 91 374 30 25  
bbvaresearch@bbva.com  
[www.bbvaresearch.com](http://www.bbvaresearch.com)