nexmo

White Paper

# Top Seven Phone Verification Challenges

## Executive Summary

No consumer wants to be the victim of a fraud or the recipient of unwelcome spam, and no app or service provider wants to be put in the position of unwittingly harboring a spammer or fraudster. It's not just because an app or service provider wants to protect its customers, either. A company's reputation is at risk if it is perceived to be less than vigilant about verifying the identities of its users.

6 billion people across the globe can be reached via phone.

As a consequence, it has become critical for businesses to ensure that the people signing up for their services are legitimate users. An ideal way to accomplish this is through the use of phone numbers to validate the identity of an individual. Indeed, phone numbers have emerged as the ultimate user identifier not just because phones have become ubiquitous but also because people retain their numbers for very long periods of time—ten years and more.

Fundamentally, identity validation via a phone number is easy: You ask a would-be subscriber to enter their phone number in your app, and then you send a PIN via SMS to that number. If the number is legitimate, the user will receive the SMS and can then enter the PIN from the text message into the app. If it matches the PIN that your app sent the user, you are assured of the association between that user and that phone number.

Traditional SMS conversion rates hover around 65% globally.

This approach to validation sounds relatively simple as described, but practically speaking it presents an organization with several challenges. One problem is that SMS conversion rates are relatively low. If you are striving to verify phone numbers in multiple countries using SMS, your aggregate conversion rate may fall even lower.

Depending on your scenario, even a small improvement in your conversion rate may create significant value or save costs. Figure 1. illustrates the value created by improving conversion. In this example scenario of new account registration, assuming a customer Life Time Value (LTV) of $20, a 5% increase in conversion rate creates a value of $100,000 per month.

**EXAMPLE SCENARIO**

Cost of Acquiring a Customer
$3.00

Lifetime Value of a Customer
$20.00

Number of Transactions/Month
100,000

RESULTS OF 5% CONVERSION INCREASE

New Cost of Acquiring a Customer
$2.86

Value Gained/Month
$100,000

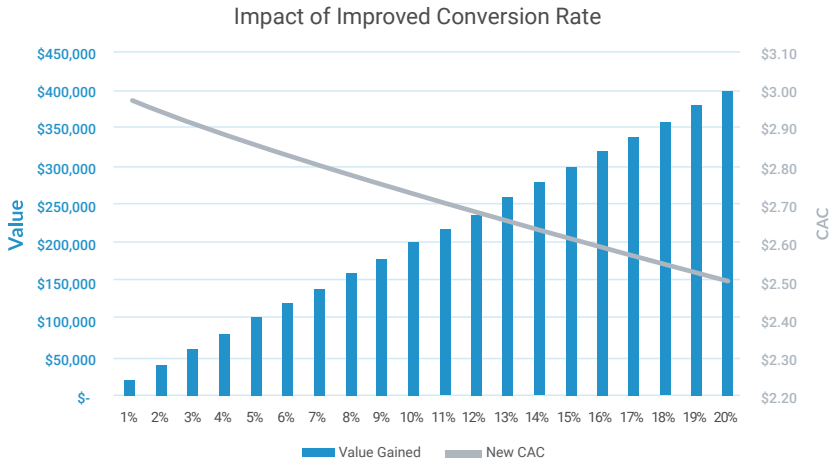


*Figure 1. Impact of improvement in conversion in a new account registration scenario*

Relying on phone numbers is the preferred way to validate user identities, but organizations need to focus on seven key areas if they are to improve conversion rates, grow the user base, and realize the full potential lifetime value from customers.


## 1. Delivering PIN Codes to SMS Recipients More Reliably

The SMS channel was originally designed as a signaling channel. As such, it was not designed with business-critical communications in mind. Unless the recipient of your message is on the same carrier network that you are on, a PIN you send via SMS will hop from aggregator to aggregator until it reaches one that has a relationship with the carrier associated with your recipient's phone. These hops, driven by least-cost rather than most-direct routing schemes, increase message latency and affect the deliverability of your PIN. The longer it takes for a user to receive a PIN, the less likely the user will enter it and complete the conversion.

It is worth noting, in this context, that message delivery receipts (DLRs) provide no real measure of latency or delivery quality. The reliability of DLRs vary from carrier to carrier. For instance, in Brazil, the networks either don't support DLRs or provide them inconsistently. Your best indicator of the time it takes for a message to arrive is the time that elapses between the sending of your PIN message and the recipient's re-entry of that PIN in your app.

Retries and voice failover increase conversion.

Depending on the quality offered by your provider in different regions, you may need to work with multiple SMS vendors to facilitate message delivery to different regions. You will also want to build and manage the routing logic among these vendors according to their ability to deliver your messages in a predictable and reliable manner.

Finally, to optimize conversions, you'll want to implement an automated resend of the PIN if the user hasn't entered the PIN within a certain time. Failing over to a voice call to present the PIN audibly is another option if the initial SMS doesn't convert.

## 2. Keeping Track of Carrier and Country Compliance Requirements

When verifying international numbers via SMS, you need to keep track of the myriad regulations relating to SMS, which vary from country to country and even from carrier to carrier within different countries. Some countries require alphabetic sender IDs while others require numeric sender IDs. Some carriers do not support unicode formats while some filter messages with certain keywords.

In India, even transactional messages are subject to filtering.

India has a national Do Not Call Register, which allows users to opt out of receiving SMS-based marketing messages. Even transactional messages, such as notifications, are subject to being filtered if sent to recipients on the Do Not Call Register—unless the app or company sending the notifications has been pre-approved by the regulator.

If your messages do not comply with local regulations, your messages will be filtered and fail to reach the intended recipient.

## 3. Dealing With Confusing Numbering Plans

Numbering plans vary from country to country. In some countries landline numbers and mobile numbers may overlap while in others there may be separate prefixes for mobile and fixed numbers. If you try to verify a user's identity by sending an SMS to a number associated with a fixed line it will fail, which will in turn reduce your conversion rate. The ability to distinguish mobile numbers from fixed numbers is critical to your success, as you would want to deliver the PIN via voice rather than SMS if the number is a fixed line number.

> Rejecting virtual numbers is critical for spam and fraud prevention.

Additionally, the ability to detect and reject the verification of virtual, Premium, and Toll-Free numbers is also critical. Unlike traditional fixed and mobile numbers, it is very easy for spammers and fraudsters to create phone numbers using these technologies, so they cannot be trusted when trying to authenticate users.

## 4. Providing a Localized User Experience

When you are verifying phones across the globe, you cannot rely on using the same message templates or languages everywhere. While English may drive conversions effectively in some regions, the local language may lead to better conversions in other regions. Starting your message with the PIN code may provide a higher conversion rate in one region; ending your message with the PIN may drive a higher conversion rate in another. You will want to work closely with SMS partners who have a strong understanding of the preferences in each area where you expect to send messages.

> Using the same template for all regions lowers conversion.

## 5. Ensuring Security

When generating a PIN to send to your users, you'll need to follow industry standard algorithms such as RFC6238[1], which generates time-based, one-time passwords (OTPs). You can determine how long these OTPs remain valid, and it is important to make sure you provide a long enough lifespan that the PIN has not expired by the time it arrives on the user's phone. At the same time, you will want that PIN to expire automatically if the user has not entered it within a reasonable period of time.

> IETF prescribes the RFC6238 algorithm to generate TOTPs.

[1] *https://tools.ietf.org/html/rfc623*

Working with an SMS provider that has direct connections to carriers can also improve message security by eliminating the vulnerabilities associated with intermediate message aggregators, who may have visibility into your messages. A direct-to-carrier approach eliminates the intermediate hops and delivers the SMS directly to the carrier associated with the message recipient. The direct-to-carrier approach has the added benefit of minimizing message latency, so your messages arrive on the user's phone faster and the PINs can have a shorter lifespan, which further improves security.

## 6. Controlling Operational and Management Costs

While automated message resends, failover to voice, the use of multiple SMS vendors, and other solutions outlined in this article can increase conversion rates, they can also increase the cost of operations. You will need to monitor and manage these costs accordingly.

> Building teams to manage routing, analytics and A/B testing drastically increases costs.

Additionally, the more global your reach and the more successful your verification endeavors, the more fixed costs you will incur from building teams to design and manage the message routing and analytics technologies, create and manage the A/B test message templates, as well as manage the SMS/voice channels, language preferences, PIN lengths, and local country/carrier compliance requirements.

## 7. Improving Insight to Optimize Conversion

Even if you manage to overcome the challenges outlined above, your conversion rates may still be nowhere near optimal. To understand why, you may need greater insight and an appreciation of context. Less than optimal conversion rates may be the consequence of something unrelated to the SMS infrastructure itself. For example, it might be that the text on the screen where a subscriber is supposed to enter the PIN is confusing. Perhaps there's an image on the screen that is considered distasteful in a particular region. Perhaps it's lack of clear directions in the app before the user requests a code. If you can see only the conversion rates relating to your own app, and if you can see only those rates at an aggregated, global level, then you may lack the level of contextual detail that you need to understand where problems may really lie and what, if anything, you can do to mitigate those problems.

> Apps require external benchmarking data to achieve optimal conversion.

## Overcoming the Challenges

Realizing the need to help companies overcome these challenges and achieve optimal conversion rates, Nexmo built *Nexmo Verify*. It builds on Nexmo's well-established direct-to-carrier approach to optimize the deliverability of PINs; it automatically manages carrier and country compliance requirements; it automatically distinguishes between mobile and fixed lines (and rejects virtual, Premium, and other fraudster-favored numbers). Nexmo Verify also localizes messages automatically, provides automated message resends and failover to voice (in local languages). It relies on industry standard security algorithms for creating short lifespan PINs. And, because Verify is available as an external service that can be accessed through a single API, it eliminates the need for heavy operational investments and staffing increases.

Nexmo has verified more than three billion phones for more than 70,000 customers—including the some of the world's largest OTT apps, such as Line, Snapchat, Viber, and WeChat. Verify is built on Nexmo's experience in optimizing routes, templates, PIN lengths and expiry, retries and failovers, and user experience to provide the highest conversion with a simple pay-per-conversion API.

Try out Nexmo Verify for free today at https://dashboard.nexmo.com/register

## About Nexmo

Nexmo provides innovative communication APIs that bridge traditional voice and text services with cloud communications. Nexmo enables applications and enterprises to make phone calls or send and receive text messages with ease to improve user experiences, no matter where in the world customers are located. High-volume communication companies such as Alibaba, Airbnb, Line and Viber send millions of messages per month using Nexmo APIs.

Nexmo was named to the 2014 CNBC Disruptor 50 list, the 2014 Hottest Companies in San Francisco by Lead411, and was recognized by analyst firm Gartner as a 2014 Cool Vendor in Communication Services.

Learn more at www.nexmo.com