ARTICLE



The EU Succession Certificate

From standardization to digitalization

Sjef van Erp^{1,2,3} · Katja Zimmermann⁴

Accepted: 3 August 2022 / Published online: 31 August 2022 © The Author(s) 2022



Abstract

The European Certificate of Succession is an obligatory form that may be used in cross-border succession cases. The form standardizes the information to be provided to interested parties. Could this standardization be further developed through digitalization, as standardization and digitalization are as closely connected as standardization and the use of forms? Could an e-copy of the certificate, issued by a smart contract running on a blockchain, be stored in the e-wallet which every European citizen might have in the near future, allowing the digital presentation of the copy to, for example, a bank or a land registry, securing Self-Sovereign Identity?

Keywords EU Succession Regulation \cdot Standard forms \cdot Standardization \cdot Digitalization \cdot E-wallets \cdot Self-Sovereign Identity

1 Introduction

The EU Succession Regulation not only introduced, within Europe, a uniform conflict of laws framework for international successions, but it also introduced a Euro-

S. van Erp sjef.vanerp@kpnmail.nl K. Zimmermann

k.zimmermann@rug.nl

- Prof. Dr. Sjef van Erp. Emeritus Professor at Maastricht University, Maastricht, The Netherlands
- Visiting Professor at Trento University, Trento, Italy
- ³ President of the International Association of Legal Science, Paris, France
- Lecturer at the University of Groningen, Groningen, The Netherlands



pean Certificate of Succession. The certificate is given its own European legal status and it has to fulfill certain specifically regulated conditions.² As such, it is a standard form, but a form that, once executed according to the prescribed requirements, provides heirs, legatees, executors and administrators authoritative evidence about their status and rights.³ Much has already been discussed about the unifying nature of this regulation and its impact on, particularly, the property law systems of the member states concerned. The most well-known example is the Kubicka case, in which it was decided that the according to the regulation applicable law may set aside a rule of national property law, in this case the rule that a legacy cannot of itself transfer ownership upon death.⁴ European Union private international law proved to be a tool towards indirect harmonization, or what might also be called: "harmonization through the back door". By creating a uniform regime regarding the applicable law, such law must be universally applied and legal systems – particularly within a setting such as can be found within the European Union - must, first of all, accommodate any foreign law which does not really fit very well into their own national system. Public policy ('ordre public') can only play the role of *ultimissimum remedium*, and the doctrine of adaptation should be applied whole heartedly.⁵ Furthermore articles aimed at limiting the impact of the unification by narrowing the Regulation's scope are interpreted from the perspective of promoting the regulation's effet utile. This applies particularly to the exclusion of the nature of rights in rem and any recording in a register of rights in immovable or movable property, including the legal requirements for such recording, and the effects of recording or failing to record such rights in a register. What has not been noted so far, however, is the unifying impact of forms.

Several categories of forms may be distinguished. A form can be voluntary or obligatory and the content of the form may be left to those using the form or may be laid down within a strict format. Any form will result in some degree of standardization and standardization, even if only more *de facto* than *de iure*, will somehow result in unification of either legal practice or even substantive law. Of course, if the form is voluntary and with content left to the users, this impact will be less than if it is obligatory and its format is mandatorily prescribed. Of course, it is also important what the legal status of the form is. Will it only be accepted as convincing evidence, but at the discretion of, for example, a court, or must it be accepted as such? With regard to the European Certificate of Succession we see that it does not have to be chosen, it does not discard any of the (pre-existing) national certificates of succession. However, if it is used, then the form with prescribed content must be used and

⁷Art. 62 EU Succession Regulation.



¹Regulation (EU) No 650/2012 of the European Parliament and of the Council of 4 July 2012 on jurisdiction, applicable law, recognition and enforcement of decisions and acceptance and enforcement of authentic instruments in matters of succession and on the creation of a European Certificate of Succession [2012] OJ 2021, L 201/107, Art. 62 ff. See *Hertel* [2], p.393 ff.

²Cf. Art. 69 EU Succession Regulation.

³Art. 63 EU Succession Regulation.

⁴Case C-218/16 Kubicka,, ECLI:EU:C:2017:755. See Van Erp and Zimmermann [9], p. 318 ff.

⁵Art. 35 and 32 EU Succession Regulation respectively.

⁶Art. 1 (2)(k) and (l) EU Succession Regulation.

the document has probative force. In other words: if the European Certificate of Succession is used, substance (prescribed content, particularly regarding the applicable law) governs the form. A form that, by the very nature of its standardization impact, results in a further, albeit indirect, unification of the law.⁸

A further aspect that is not very often highlighted is the close relationship between standardization and digitalization. Digitalization may take place whenever certain acts, behaviour etc. can be reduced to standard situations, which can be analyzed – to reduce it to somewhat basic terms – on a 'yes' or 'no' basis. Digitalization follows from automation, and automation follows from standardization. Standardization may happen through the use of forms.

We will first briefly discuss digitalization, then standardization through the use of forms, followed by a discussion on whether the European Certificate of Succession, an obligatory standard form, could be issued in digital format. Finally we ask the question if copies of the European Certificate of Succession could be created by smart contracts running on a blockchain, connecting this with recent proposals by the European Commission to introduce for every European citizen an e-wallet for storing digital assets. Could such an e-wallet contain an e-copy of the certificate?

2 Digitalization

Regarding digitalization, three developments should be mentioned here. We can only sketch these developments. First of all Distributed Ledger Technology and more particularly blockchain technology. Distributed Ledger Technology makes it possible to decentralize databases in such a way that every computer taking part in the system constantly synchronizes its data with any changes, which occur on any of the other participating computers. Blockchain technology builds upon this by building data units or clusters of data called 'blocks' which, once created, cannot be changed. The first application was a blockchain called 'Bitcoin' and the blocks contained, as they were programmed, virtual money. However, these blocks (sometimes also called 'coins' or 'tokens') can also contain different data. When blocks are created they may be connected to a particular user, who then must store the references to these blocks in a special file called 'wallet'. This wallet is software that creates a shell around the blocks and thus limits who has access. Such access is based on cryptographic 'keys'. Transactions regarding these blocks are often done with the help of self-executing software, called 'smart contracts'. The outcome of a transaction, for example the transfer of a block from one person to another, is also stored in a block, which is then cryptographically connected with the earlier block, thus creating a 'block chain'.

What is interesting about these developments from the perspective of EU international succession law is that the European Union is considering to create for its citizens European identities and connected with these identities individual wallets. These wallets then should make it possible that an individual EU citizen uses their

⁹The available literature on blockchains and smart contracts is enormous and still growing fast. See, for example, *Werbach* [11] and *Hanzl* [1].



⁸Cf. *Marino* [7], p. 627 ff.

data only when and in so far as necessary in a particular situation for a particular service. In this way you do not need to give up more information about yourself than necessary. For instance, if you want to buy alcoholic drinks it may be necessary to show that you show your picture and that you are over 18, but it is not necessary that you also show your address. If this method of using personal data is followed, it gives European citizens not just an identity, but a so-called 'Self-Sovereign Identity' (or SSI).¹⁰

Given that the information in the first block, which would be the original of the certificate, must be correct, we need a guardian to check the input. In a Civil Law system this could, depending upon the particularities of the system, be a notary or a judge, in Common Law systems this could be solicitor. Wrong information in the first ('genesis') block would result in, what is sometimes called, a 'rubbish in, rubbish out' situation and that must be avoided at all costs. In other words, and this goes against those who originally designed the software we are discussing, we still need Trusted Third Parties at the beginning of the block chain.

The question that we are interested is whether it would be practically useful to store a copy of a European Certificate of Succession in such a wallet, together with automatizing the process by having copies issued by smart contracts to interested parties (heirs, legatees, executors) after proving their identity by giving access to their wallet. This would imply, to begin with, that the original certificate must be stored as a 'block' on a blockchain system that, expressing its European origins and nature, could be set up on a European level. An advantage would be that the time limit of the copy could be programmed into the copy, so it would automatically expire after 6 months. A further advantage would be that in situations where European certificates have to be issued massively, as might be the case in emergency (e.g. because of war) situations, the issuing of the copies could be done by the blockchain system itself. Would this be feasible?

Already today, the certificate must be in an obligatory format, which is available in a Word layout. Could we build upon this further by connecting it with plans to create such as an EU wallet? Let us first look at standardization as such with regard to the European Certificate of Succession.

3 Standardization

The EU Succession Regulation contains references to a variety of standard forms.¹¹ These standard forms were not established by the EU Succession Regulation itself but by a separate Implementing Regulation in 2014.¹² These include forms to attest a de-

¹²Commission Implementing Regulation (EU) No 1329/2014 of 9 December 2014 establishing the Forms referred to in Regulation (EU) No 650/2012 of the European Parliament and of the Council on jurisdiction, applicable law, recognition and enforcement of decisions and acceptance and enforcement of authentic instruments in matters of succession and on the creation of a European Certificate of Succession [2014] OJ L 359 16.12.2014, p. 30.



¹⁰See for more information on the proposals: "European Digital Identity," accessed 20.06.2022, https://ec.europa.eu/info/strategy/priorities-2019-2024/europe-fit-digital-age/european-digital-identity_en.

¹¹ Art. 46 (3)(b), 59 (1), 60 (2), 61 (2), 65 (2), and 67 (1) EU Succession Regulation.

cision (Form I), ¹³ authentic instrument (Form II), ¹⁴ or court settlement (Form III) ¹⁵ in a succession case as well as forms to apply for and issue a European Certificate of Succession (Forms IV and V). ¹⁶ Nevertheless, Forms II and IV, whose use is optional, show that the mere existence of standard forms do not require their mandatory use. ¹⁷ In the following, the optional and mandatory use of these forms shall be further discussed through the lens of standardization by focusing in particular on the standard forms established for the application and issuance of the European Certificate of Succession.

3.1 Optional use of standard forms

In the *Brisch* case, the Court of Justice of the European Union (hereafter: CJEU) ruled that the use of the standard form to apply for the issuance of a European Succession Certificate (Form IV) is voluntary. After all, Art. 65 (2) European Succession Regulation explicitly states that "the applicant *may* use the form" (emphasis added). Furthermore, contrary to the other standard forms provided by Implementing Regulation, Form IV itself indicates that it is "non-mandatory". Therefore, as long as the applicants provide the information enumerated in Art. 65 (3) European Succession Regulation, they are free to decide how to present the required information to the authority that is competent to issue the European Certificate of Succession. 21

Why then has the EU legislator decided to provide standard forms if their use is optional? The underlying assumption is that the standard form increases efficiency as it makes it easier for both the applicants to determine what information needs to be provided and to check whether the application includes that information as well as for the competent authority to control whether all necessary information has been provided. At the same time, it must not be left unmentioned that despite the availability of the standardized form, national law still applies to the procedural aspects governing the submission of the application. By means of example, Kreße refers to "the language to be used for the application with or without making use of the standard



¹³Art. 46 (3)(b) EU Succession Regulation. Also see art. 1 (1) Implementing Regulation No. 1329/2014.

¹⁴Art. 59 (1), 60 (2) EU Succession Regulation. Also see art. 1 (2) Implementing Regulation No. 1329/2014

¹⁵Art. 61 (2) EU Succession Regulation. Also see art. 1 (3) Implementing Regulation No. 1329/2014.

¹⁶Art. 65 (2), 67 (1) EU Succession Regulation. Also see art. 1 (4) and (5) Implementing Regulation No. 1329/2014

¹⁷While the use of Forms II and IV is optional, the use of Form V is mandatory. Further, it appears that the mandatory nature also applies to Forms I and III. See *Mansel* [5], para. 29. Also see Case C-102/18 *Brisch*, ECLI:EU:C:2019:34, paragraph 32, 37. Also see *Kreβe* [3], para. 10. Also see *Kreβe* [4], para. 13. Also see *Mansel* [6], para. 3.

¹⁸Case C-102/18 *Brisch*, ECLI:EU:C:2019:34, paragraph 32, 37.

¹⁹Case C-102/18 *Brisch*, ECLI:EU:C:2019:34, paragraph 23. Also see *Kreβe* [3], para. 10.

 $^{^{20}\}mathrm{Case}$ C-102/18 Brisch, ECLI:EU:C:2019:34, paragraph 26, 31. Also see Annex 4 of the Implementing Regulation No. 1329/2014.

²¹Case C-102/18 Brisch, ECLI:EU:C:2019:34, paragraph 24.

²²Schmidt [8], Rn. 56.

²³*Kreβe* [3], para. 10.

form, or the quantity of copies of the application that need to be lodged". ²⁴ It could therefore be the case that national law permits applicants to submit the standard form in a language other than the official language of the Member State in which competent authority is appointed, while that option would not exist if a different means of supplying the same information were chosen. After all, standard forms that are available in all official EU languages have – at least in theory – the capacity of rendering burdensome and cost-intensive translations unnecessary. ²⁵ If the competent authority receives a foreign standard form, they could consult the standard form in their own language in order to understand the information that has been filled in by the applicant. For information about names and addresses, this method is unproblematic and efficient as long as the form is completed in a familiar alphabet. However, it must be emphasized that the standard form also includes 'open' text boxes to provide (unspecified) additional information.²⁶ This is where standardization as solution for the necessity of translations reaches its limit because if the competent authority does not speak the language, in which the additional information has been filled in, they will not be able to decipher it with the help of the standard form. A translation of the additional information will then be inevitable, which in light of potential liability claims might even have to be an authentic translation that is prepared by a sworn-in translator.

Despite the advantages of using the optional standard form, it is unclear to what extent this particular standard form is actively used in practice. After all, before a European citizen can submit their application to the issuing authority, they first have to know that the relevant succession case is governed by the European Succession Regulation, that there is a standard form to apply for a European Certificate of Succession, and that it can be found in annex 4 of Implementing Regulation No. 1329/2014 or alternatively on the e-Justice Portal.²⁷ In practice, it might be more likely that a European citizen directly turns to a legal professional (in most cases that is a Latin notary) without first filling out the standard form. The legal professional will then advice the applicant on the best course of action, which may not necessarily involve the submission of Form IV, especially considering that the standard form is a seven-page document with an additional nine pages of annexes.²⁸ Depending on the circumstances, national laws might provide for easier alternative to apply for a European Certificate of Succession. If that is the case, recourse must be sought to "national procedural law, in order to establish, for example, whether the application needs to be filed in writing".²⁹

3.2 Mandatory use of standard forms

When issuing the European Certificate of Succession, Art. 67 (1) EU Succession Regulation prescribes that the issuing authority "shall use the [standard] form" (em-

²⁹ Kreβe [3], para. 10.



²⁴*Kreβe* [3], para. 10.

²⁵Schmidt [8], Rn. 55.

²⁶For instance: Form IV, text box 2.3.

²⁷ "Succession. General Information," accessed 12.06.2022, https://e-justice.europa.eu/166/EN/succession.

²⁸Annex 4 of Implementing Regulation No. 1329/2014.

phasis added).³⁰ The mandatory use of Form V has two important implications. First, the European Certificate of Succession "is null and void" if the issuing authority issues a European Certificate of Succession while abstaining from the required standard form.³¹ Second, while it appears that the EU Succession Regulation does not allow the competent authority to issue an extract of the Certificate, the issuing authority may restrict themselves to only provide the information that is strictly necessary under the Regulation, which according to Art. 65 (3) EU Succession Regulation is "information [that] is within the applicant's knowledge and [that] is necessary in order to enable the issuing authority to certify the elements which the applicant wants certified".³² The standard forms themselves also distinguish information that *must* be filled in from information that *can* be filled in. To this end, mandatory information is marked by an asterisk in the relevant text box on the standard form.³³ Through the adoption of the asterisk system, the EU legislator has created a minimum standard of information that must be included in the standard forms.

An interesting and highly relevant question that needs to be posed in this regard is what the consequences are if an issuing authority did not fill in all information that is marked by an asterisk. In the case UE and HC v Vorarlberger Landes- und Hypotheken-Bank AG, the CJEU had to rule on the validity of a copy of the European Certificate of Succession, which did not state a concrete date of expiration as required by Art. 70 (3) EU Succession Regulation and instead expressed "unlimited duration". 34 Despite the fact that the standard form marks the date of expiration as mandatory information, the CJEU concluded that "the objective of Regulation No 650/2012, as is apparent from recital 7 thereof, which is to facilitate the proper functioning of the internal market by removing the obstacles to the free movement of persons who face difficulties in asserting their rights in the context of a succession having cross-border implications, would be compromised if the heirs or other persons with a legitimate interest were unable to establish their rights due to a formal error in the certified copy of the European Certificate of Succession which was issued to them, but would have to request a new copy of that certificate, which would lead to longer delays and higher costs". 35 By the same token, it cannot be denied that this conclusion also has a negative impact on the level of standardization that is achieved through the standard forms as it introduces exceptions. In addition, it invites the question whether exceptions are also possible with regard to other information that is marked by an asterisk as mandatory information.³⁶



³⁰Art. 67 (1) European Succession Regulation.

³¹ Кreße [4], para. 13.

³²Art. 65 (3) European Succession Regulation. Also see *Van Erp* and *Zimmermann* [9], pp. 329–330.

³³In Form V, mandatory information for instance includes the name and address of the issuing authority (text boxes 2.1–2.2) and personal information of the applicant (e.g. text boxes 5.1, 5.3–5.6).

³⁴Case C-301/20 *UE and HC v Vorarlberger Landes- und Hypotheken-Bank AG*, ECLI:EU:C:2021:528, para. 20. For a more extensive analysis of the judgment, see: *Zimmermann* and *Van Erp* [12], pp. 975–985.

³⁵Case C-301/20 UE and HC v Vorarlberger Landes- und Hypotheken-Bank AG, ECLI:EU:C:2021:528, para. 27.

³⁶Zimmermann and Van Erp [12], p. 984.

4 Standard forms is digital format

The standard forms can be accessed as an HTML, Word, or PDF document.³⁷ In principle, this implies that the forms first have to be downloaded before they can be filled in. However, there are two exceptions to this general rule. First, several issuing authorities have generated their own digitalized versions of the standard forms to facilitate the process of completion and issuance. Second, the e-Justice Portal has created a free online tool to fill in a digital European Certificate of Succession (Form V).³⁸ Upon completion, they can save the Certificate as a PDF document.³⁹ This tool also allows issuing authorities to first download the dynamic standard form so that it can be digitally completed on their own computers.⁴⁰ Unfortunately, a comparable digital solution is not offered for the other standard forms.

In a stage of further digitalization, the Certificate as a pdf document could be stored on a blockchain (either the whole pdf document or a hash code referring to the document 'off-chain', securing that any document issued is the same as was originally issued). The original Certificate of Succession would still have to be prepared and issued by the competent authority, to guarantee that the information is in accordance with the requirements of the Succession Regulation and the factual situation. For this purpose a Trusted Third Party is still vital. Copies of the Certificate could then be given to those entitled to it by using the European Union wallet. That would allow users of those wallets to present the copy electronically to, for example, a bank or a land registry.

5 Conclusion

Economic integration as we see this happening within the European Union, focusing not only on goods, services, capital and data, but also on people, cannot fruitfully develop without legal integration. Differing law creates obstacles not only to trade, but also to people settling in another member state. Already by itself legal integration is a complex and long term process when focusing on those parts of the law which are

⁴¹Hashing implies that a short digital reference is created that represents the original document.



³⁷The Implementing Regulation provides the forms as HTML and PDF format. These can be accessed through EUR-lex: "Implementing Regulation No. 1329/2014," accessed 12.06.2022, https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex:32014R1329. In addition, the e-Justice Portal provides the forms as a Word document. See: "Succession. General Information," accessed 12.06.2022, https://e-justice.europa.eu/166/EN/succession. See also from the perspective of a land registrar: *Vos* [10], p. 783 ff., 788.

³⁸This tool can be found here: "European Certificate of Succession," accessed 12.06.2022, https://e-justice.europa.eu/478/EN/european_certificate_of_succession?clang=en. The online form can be found here: "Form V," 12.06.2022, https://e-justice.europa.eu/dynForms.do?1655058787592&introMemberState=1&introTaxonomy=478&form4BC=ecs&subform4BC=dynform_ecs_e¤tPage=dynform_ecs_e_1&selectedFormPage=dynform_ecs_e_1_action&redirectPath=/jsp/dynforms/ecs/dynform_ecs_e_1_tile.jsp.

³⁹ "Succession. General Information," accessed 12.06.2022, https://e-justice.europa.eu/166/EN/succession.

⁴⁰"European Certificate of Succession," accessed 12.06.2022, https://e-justice.europa.eu/478/EN/european_certificate_of_succession.

facilitating a social market economy, but in areas close to a citizen's personal sphere such as family and succession law, this is also a very sensitive area. That is why legal integration in these areas can only take place by unifying private international law so that in cross-border situations it is at least generally clear which law applies. This simplifies both ex ante planning of the legal consequences of a marriage or succession with international elements and ex post resolving any issues which might have arisen. However, we are still talking about unifying a part of the law, even though the rules focus on resolving questions with a cross-border element, and this also has indirect consequences for substantive law. If a foreign legal system proves to be applicable and this comes into conflict with a particular national legal system, national law will have to accommodate the foreign solution. The use of forms may have this same impact, especially if use of the form is obligatory. The uniform rules on the European Certificate of Succession create by themselves already a standard form, which is even more stringent if the form itself is obligatory. Standardization and the use of forms go hand-in-hand. Frequently, digitalization is also the outcome of standardization. This implies that whenever the law reaches standardization, and especially if standardization takes place in the shape of an obligatory form, it can be considered whether this could not also be done in digital format using advanced Internet Technology.

Following this line of thought, we attempted to show how the European Certificate of Succession could perhaps be integrated into the proposals regarding a European wallet for every European citizen. The original certificate would still have to be issued by the competent authority, but could then be stored on a blockchain. Copies could be issued to for example an heir by using smart contracts, which would store the copy into a citizen's EU wallet, thus enabling the heir to present the copy digitally to a third party following the principle of Self-Sovereign Identity.

Open Access This article is licensed under a Creative Commons Attribution 4.0 International License, which permits use, sharing, adaptation, distribution and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons licence, and indicate if changes were made. The images or other third party material in this article are included in the article's Creative Commons licence, unless indicated otherwise in a credit line to the material. If material is not included in the article's Creative Commons licence and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission directly from the copyright holder. To view a copy of this licence, visit http://creativecommons.org/licenses/by/4.0/.

References

- 1. Hanzl, M.: Handbuch Blockchain und Smart Contracts. Linde Verlag, Vienna (2020)
- 2. Hertel, C.: European Certificate of Succession—content, issue and effects. ERA Forum 15(3), 393–407 (2014)
- Kreße, B.: Article 65 application for a certificate. In: Caravaca, C., et al. (eds.) The EU Succession Regulation: A Commentary. Cambridge University Press, Cambridge (2016)
- Kreße, B.: Article 67 issue of the certificate. In: Caravaca, C., et al. (eds.) The EU Succession Regulation: A Commentary. Cambridge University Press, Cambridge (2016)
- Mansel, H.-P.: Article 59 acceptance of authentic instruments. In: Caravaca, C., et al. (eds.) The EU Succession Regulation: A Commentary. Cambridge University Press, Cambridge (2016)
- Mansel, H.-P.: Article 61 enforceability of court settlements. In: Caravaca, C., et al. (eds.) The EU Succession Regulation: A Commentary. Cambridge University Press, Cambridge (2016)



- Marino, S.: Use of standard forms in EU civil judicial cooperation: the case of the European Certificate of Succession. Cuad. Derecho Transnac. 12(1), 627–634 (2020)
- Schmidt, J.: EuErbVO Art. 65 Antrag auf Austellung eines Zeugnisses. In: Budzikiewicz, C., Weller, M.-P., Wurmnest, W. (eds.) beck-online. Grosskommentar. Beck, München (2022)
- Van Erp, S., Zimmermann, K.: The impact of recent EU conflict of law regulations on land registration. A theoretical and practical perspective. In: Muller, G., et al. (eds.) Transformative Property Law. Festschrift in Honour of AJ vd Walt. Juta, Cape Town (2018)
- Vos, J.: De invoering van een Europese verklaring van erfrecht en een landregistratie informatiemodel: simplificatie van het recht door invoering van formulieren? Weekblad voor Privaatrecht. Notar. Regist. 7030, 783–792 (2014)
- 11. Werbach, K.: The Blockchain and the New Architecture of Trust. MIT Press, Cambridge (2018)
- Zimmermann, K., Van Erp, S.: Prejudiciële vragen Europese erfrechtverklaring: afschrift is zes maanden geldig en sorteert gevolgen voor alle genoemde personen. Jurisprud. Erfrecht 7, 975–985 (2021)

Publisher's Note Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.

