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Towards examining and addressing the danger of unaccompanied migrant minors going missing

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The phenomenon of missing children is complex, further complicated by the specific circumstances of missing unaccompanied migrant minors. Owing to the (often forced) migration, these children have moved through different countries with diverse legislation and work practices. The international nature of these cases leads to confusion about the responsibility of different actors. Additionally, for these cases, little data are available. This article critically assesses current work practices in the EU. It also introduces a new practical solution based on empirical data from 26 international expert interviews, proposing a new alert system for missing children cases to improve the efficiency in responding to them and the international communication between stakeholders to improve the situation of missing unaccompanied migrant minors. The solution is currently in use by three organisations and has already been used in more than 85 real-life cases. It is concluded that it holds the potential to connect actors in a new, efficient way and prevent children, and unaccompanied migrant minors particularly, from falling off the grid. It is also highlighted that the situation of unaccompanied migrant minors is highly disadvantaged, and new, homogenous legislation among the EU member states that does not discriminate against the rights of migrant minors is imperative. New research should also actively involve them to better grasp their situation before and during their disappearance.

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Introduction

Throughout history, the phenomenon of missing children[1] has been perceived in various ways, ranging from a romanticised view of (male) runaways as adventure seekers in a Huckleberry Finn type scenario (Slesnick et al., 2011, p. 276), to casting the missing child as a delinquent that requires state punishment (Zide and Cherry, 1992, p. 156). While data on the phenomenon of missing children varies in quality and reliability, one study found 242.451 cases of missing children reported to the police in 2012 in the reporting 23 EU member states alone (Cancedda et al., 2013, p. 70). Based on these numbers, Missing Children Europe (MCE) estimates that there are over 250.000 cases of missing children annually in the EU alone (MCE, 2021), with an estimated 8 million children going missing each year globally, according to the International Centre of Missing and Exploited Children (ICMEC) (Shankar and Gadkar, 2015, p. 115). However, it should be noted that international data on missing children are problematic in nature due to different national legal definitions of the nature of 'going missing', as well as diverse protocols on the waiting periods and consequent actions to missing incidents (Cancedda et al., 2013, p. 6). The differing definitions lead to a further discrepancy in the cases considered as missing children in the different countries, thereby leading to a variation in the reported numbers (ICMEC, 2016, p. IV).

Still, every individual case represents a child suffering from an increased risk of victimisation or even death. The victimisation in question ranges from verbal, physical, or sexual abuse to labour and sexual exploitation, rape, and human trafficking (cf. ibid.). While all missing children face dangers of an emotional or physical nature, the individual child's situation varies depending on the circumstances of the disappearance. Unaccompanied migrant minors, the subgroup of missing children at the centre of this article, face specific dangers after going missing in the EU due to their vulnerable and often marginalised status.

Hence, this article sets out to outline the specific situation of missing unaccompanied migrant minors in the EU, including the issue of a lack of reliable data and handling of their cases, as well as presenting the toolset that was developed in the EU-funded research project ChildRescue to address them. Consequently, for the scope of this article, the specific issues that missing unaccompanied migrant minors in the EU raise shall be examined first, before introducing new insights founded on a total of 26 qualitative interviews conducted during the above-mentioned project with experts from four EU countries. Both research and the interviews enabled unearthing crucial information on missing children to develop an innovative new technological solution that shall be showcased in the third part of this article. By targeting both missing children, who were born in the EU as well as missing unaccompanied migrant minors, the severe lack of information on the challenges facing the second group was rendered visible.

Analysing the EU context for missing unaccompanied migrant minors

In the context of this article, a missing unaccompanied migrant minor shall be defined, following the EU's definition, as a third-country national or stateless person below the age of 18 years, who arrives on the territory of the (Member) states unaccompanied by the adult responsible for them by law or by the practice of the (Member) state concerned or is left unaccompanied within the territory of the EU after arrival with an adult (EU, 2011: DIRECTIVE 2011/95/EU). Hence, it is limited to minors who have come from outside the EU and go missing within the EU after their initial arrival due to different reasons.

While other missing children can (and often are) also unaccompanied, the specific social status of unaccompanied migrant minors raises additional difficulties in handling these cases that shall be discussed in the following.

The distinctive situation of missing unaccompanied migrant minors in the EU. As a first note, there is a serious lack of reliable data on missing unaccompanied migrant minors and their fate, both internationally and in a national context (Shalev Greene and Alys, 2017, p. xvii). This also concerns Germany (Rosenow-Williams et al., 2019, p. 254), which acknowledges, though, the increased risk of victimisation in human trafficking for unaccompanied migrant minors. Legal professionals have pledged for its recognition in the German human trafficking criminal code (Bürger, 2017, p. 169), as well as the German Ministry for Migration and Refugees (BAMF) (BAMF, 2018, p. 76). The German Federal police force, called Bundeskriminalamt (BKA), regularly updates the numbers of missing and cleared cases on their website. Issues with data on missing unaccompanied migrant minors become clear when taking a closer look at the BKA data: due to the report not being released in print, the continuous update of numbers is not visible, not enabling any conclusions on the actual clearing rate within the same year. For example, between February and May 2020, the clearing rate for 2017 climbed from 82,91 to 96,62% and from 87,63 to 94,51% for 2018, with no reference to the old numbers. Therefore, the difference in clearing rates between unaccompanied migrant minors and other missing children seems to largely lie in the time needed to 'clear' a case. Consequently, the largest difference in clearing rates is shown in the most current data for 2019 – with only 80,79% of cases of missing unaccompanied migrant minors being cleared in comparison to 97,9% of missing children and 98,61% of missing adolescents. While the rise in cleared cases is in itself a positive development, the lack of a clear definition of what constitutes 'cleared cases' as well as the everchanging data without a reference frame to the time it took for the cases to be cleared is less than ideal. Listed 'cleared cases' could also include cases in which the child has turned 18 since going missing, thereby automatically being excluded from the category of missing children. Additionally, even when using the most current data, the clearing rate for unaccompanied migrant minors is lower than the clearing rate for other missing children. As seen in Fig. 1, the clearing of these cases takes significantly longer than other missing children cases, as mirrored in the especially high number of open cases in 2019 when compared to other missing children. However, even for earlier years, the clearing rate remains lower than for other missing children. In sum, even with the most
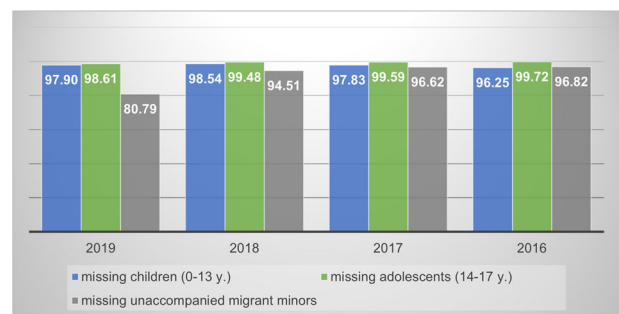

Fig. 1 Clearing rate for different groups of missing children in Germany. Missing children (0-13 y.) in blue, missing adolescents (14-17 y.) in green, and all missing unaccompanied migrant minors (0-17 y.) in grey.

current numbers of 'cleared cases', there are 1165 unaccompanied migrant minors that went missing between 2016 and 2019 and are still unaccounted for. Of these missing children, some are assumed to be registered as 'accompanied migrant children' after being reunited with family members, thus remaining listed as missing unaccompanied minors (cf. Deutscher Bundestag, 2020: (1). However, since there is no information on the nature of these cases, the number of unaccompanied migrant minors in high-risk situations remains unknown. The lack of reliable data due to the issue of underreporting and simultaneously multiple reports of the same child as missing through faulty name reports at the shelters has also been acknowledged by the German government (BMFSFJ, 2020, p. 28). Additionally, the German states have different guidelines in handling missing unaccompanied migrant minors with varying timelines for reporting them missing, which adds to the issues with data quality as well as the risk for these children (BMFSFJ, 2020, p.28f.).

Missing unaccompanied children seeking for asylum are particularly vulnerable to exploitation (Shalev Greene and Alys, 2017, p. 2). Owing to the time sensitivity of these cases and the accompanying risk of further victimisation, the longer time frame for resolving cases of unaccompanied migrant minors poses a genuine threat to their overall wellbeing. While the rise in cleared cases is a positive development, the lack of a clear definition of what constitutes 'cleared cases' and the everchanging data without a reference to the time it took for the cases to be cleared are less than ideal. Listed 'cleared cases' could also include cases in which the child has turned 18 since going missing, thereby automatically being excluded from the category of missing children. Additionally, even when using the most current data for past years, the clearing rate for unaccompanied migrant minors remains lower than for other missing children, which is also the case for earlier years, as depicted in Fig. 1.

While the absolute number of missing unaccompanied migrant minors in Germany has dropped since 2018, which the BKA attributes to the closed Balkan migration route, the difference in percentages of recovered missing children remains. Additionally, the BKA itself reveals the ominous nature of their data due to unregistered or wrongfully registered children. Thus, since there is no information on the nature of these cases, the number of unaccompanied migrant minors in high-risk situations remains unknown.

Moreover, missing unaccompanied migrant minors are vastly underreported. This relates both to potential victims of human trafficking, who are seldom reported to the police (European Migration Network, 2018, p. 10) and the lack of reporting of cases to specialised Non-Governmental Organisations (NGOs). MCE annually collects data on its member states (in 2019, $N = 23$). Only 47,6% reported that they work on missing children in migration, and only five organisations could provide more information on the time it took before the missing minors were recovered (MCE, 2020, p. 6). Of the reported data, the trends that were showcased by the German clearance rate continue: only 43% of the reported missing children in migration were found within a year (MCE, 2020, p. 6). Compared to other categories of missing children, cases of children in migration take the longest to be solved or are not located at all (cf. ibid.).

International data are just as insufficient for truly grasping the situation of unaccompanied migrant minors within the EU. An apparent spike in numbers of unaccompanied migrant minors entering Europe was noted in the wake of the Syrian war in 2015 (Menjivar and Perreira 2019, p. 198). This rise in migrants arriving in Europe—including unaccompanied minors—was framed as a 'crisis' by right-wing media, as it threatened the established strategy of tight border control for people outside the EU (Lems et al., 2020, p. 315). The number of refugees has been

rising in the last decade, and more than half of them are underage (Rosenow-Williams et al., 2019, p. 253). The number of children migrating alone is also growing, estimated at 300,000 in 2015–2016 (UNICEF, 2017, p. 6). Italy, for example, being an important crossroads in the route from Africa to Europe, had, as of April 2017, 15,939 unaccompanied migrant minors, accounting for 92% of the children arriving in Italy in 2016 and beginning of 2017 (Rania et al., 2018, p. 98).

However, due to differing international definitions of 'missing unaccompanied migrant minors' and a lack of consistent data, the actual number of missing children in the EU remains unknown (European Migration Network, 2020, p. 1). While almost 20.000 unaccompanied migrant minors have been registered upon entering the EU in 2018 alone (EUROSTAT, 2019), there is little additional information, such as a gender and age breakdown (EUROPOL, 2018, p. 20). Despite not knowing the actual numbers, more than 30.000 migrant and refugee children are assumed to have gone missing between 2014–2017 in the EU, only some of which were officially registered (European Migration Network, 2018, p. 9). While some minors may seek asylum as they enter the state, some migrate irregularly either as a result of their choice to not be bound to the first state in which they have arrived or due to the stricter asylum laws of some member states, which may result in their removal (Menjivar and Perreira 2019, pp. 198–199).

Furthermore, the reasons for these missing incidents are far from clear, with suspicions including a general lack of trust in the state and its willingness to grant asylum, a desire to be reunited with family in other countries, lengthy asylum processes that the adolescents do not understand as well as exploitation, human trafficking and abduction (EUROPOL, 2018, p. 21). Other reasons also include a lack of appropriate shelters and pressures from traffickers—who pose as smugglers—to leave the facilities (MCE, 2020, p. 6). Furthermore, the EU member states' attempts to save tax money by placing unaccompanied migrant minors in cheaper accommodation that does not include tight-knitted social and psychological support; for instance, in the UK, older youths (so minors from the age of 16) in semi-independent housing instead of foster homes (Humphris and Sigona 2019, p. 321).

Additional issues arise due to the make-up of the EU as a union of countries with varying political interests and strategies. As recently highlighted by the uncertainties surrounding the general future of the EU's relationship with the UK after Brexit, this heterogeneous patchwork of different states can lead to difficulties in handling cross-border cases. With the Brexit, the UK could lose access to EU-wide support structures for handling cross-border missing cases, such as EUROJUST or EUROPOL, and the Schengen Information System (SIS II), used for real-time EU-wide alerts about suspects. This could prove problematic in protecting third-national children from human trafficking and exploitation (European Children's Rights Unit 2017, p. 17). Consequently, at least while the details of follow-up agreements between the EU and the UK are being negotiated, the safety of all missing children involved in cross-border cases, but specifically those of marginalised children such as unaccompanied migrant minors, is at risk.

Unaccompanied migrant minors are further disadvantaged by their lack of a secure social network. In comparison to children who were born and raised in the same city they disappear in, unaccompanied migrant minors, who may have just arrived in the country, have a lack of geographical knowledge as well as social resources. In an attempt to gain reliable information on safe travelling routes through Europe, many unaccompanied migrant minors rely on informal sources, such as social media or other digital platforms and rumours from other minors, rather than official state resources (Dekker et al., 2018, 2-3). While these

informal sources work faster due to a lack of the state's bureaucracy, they carry increased risks of wrong information and victimisation by traffickers posing as helpful smugglers. Therefore, the use of social media for the decision-making process in migrating through Europe includes both benefits and severe perils for these minors. The appeal of a fast and—presumed validated—testimony of another child in a similar situation is promising to unaccompanied migrant minors, who get tired of the lengthy asylum decision-making processes of the European states or who have not reached their intended destination country yet.

Additionally, while the EU legally requires its member states to grant legal guardianship to unaccompanied migrant minors who have fallen victim to human trafficking, according to Article 14(2) of the Directive 2011/36/EU of the European Parliament and the Council of the EU, and demand equal treatment of all missing children regardless of their nationality or immigration status, the work practice does not always fall in line with this (European Migration Network, 2020: 1). Apart from child human trafficking victims, the EU member states are only required to appoint a legal guardian to minors who have applied for asylum in the country, thereby not granting protection to irregularly migrated minors (Cancedda et al., 2013, p. 17). Unaccompanied migrant minors, who have illegally entered the country, are left without shelter or access to official resources, further increasing their risk for victimisation. Since the responsibility for the safeguarding of unaccompanied migrant minors in cross-border cases is often unclear, and the child-specific laws in the Common European Asylum System (CAES) remain fragmentary, their safety remains at risk (Iusmen, 2020, p. 930–931).

In many cases, though, the problem starts with the very recognition of the child as an unaccompanied migrant minor, especially when migration flows are on the rise. In France, to be recognised as unaccompanied minors, they must first undergo an assessment procedure, which concludes deeming half of them non-eligible to child protection (Frechon and Marquet, 2017, p. 8). The conditions in which the assessments are conducted are doubtful and contrast with the UN Children's Rights Convention principles, which states that minors should be given equal opportunities with no distinctions. According to surveys, even when recognised as unaccompanied minors, they are not given the same protection as other minors in care (Frechon and Marquet, 2017, pp. 9–10). In Greece, receiving around 4000 unaccompanied minors each month, insufficient capacity in shelters seems to be the reason leaving many of these children out of protection and placing them in a vulnerable state (Mishra et al., 2020). Assessment procedures are also in place in Greece to decide which of them are most vulnerable—usually based on age—to be guaranteed a place in shelters. It turns out, though, that over half of them end on a waitlist. Furthermore, over 90% of unaccompanied minors in Greece are older adolescents qualified for shelters for limited periods, while there is no information on what happens to them when these periods end or when they turn 18 being still waitlisted.

Moreover, the legal framework and particularly the social practice in responding to missing unaccompanied migrant minors increase their vulnerability by disadvantaging these missing children compared to those born within the EU. Despite the initiation of the CEAS in the 1990s, which promised an ongoing harmonisation of asylum practices in the different EU member states, the focus of CEAS has vastly been placed on migration control with little concern for the human rights of asylum seekers in general and unaccompanied migrant minors specifically (Iusmen, 2020, p. 930). Most member states, such as France, Italy, Portugal and Spain (Hjern et al., 2017), are applying the same or similar procedures to the ones for missing national

children. However, NGOs have criticised the gap between the theoretical guidelines and actual work practice (European Migration Network, 2020, p. 1). Additionally, problematically heterogeneous practices among the different EU member states remain underlining the lack of unity in the political views of the member states, which has a direct negative impact on the human rights of unaccompanied migrant minors (Iusmen, 2020, p. 934). Even within member states, protocols may vary locally, with uneven protection standards and no binding regulations for refugee shelters, which can put some minors at risk (Rosenow-Williams et al., 2019, p. 265). In response to the influx of refugees, asylum laws have also been tightened in some European countries. In Norway, for example, minors between the ages of 16–18 may only receive a temporary residence permit under certain circumstances, which undermines any regards for the safety of children in favour of state migration control interests (Sorsveen and Ursin, 2020, p. 2).

Additionally, different member states have implemented varying time frames in response to missing cases. While some states indicate that they respond to a missing case report within 24 h, other countries reported that they respond after 'more than 24 h', including prolonged waiting periods before any action is taken and, consequently, an increased risk of victimisation for these children. Also, Greece has implemented an 'ad-hoc' timeframe, meaning the response depends on the case's specifics, and there is no set frame to adhere to (European Migration Network, 2020, p. 3). These differing timelines can confuse the responding actors and lead to a further delay in recovering the missing child. Since these differences in handling missing unaccompanied migrant minors do not exist about other missing children, this further constitutes a discriminatory practice that disadvantages the safety of these missing minors.

Multiple EU member states do not adhere to a single guideline in reporting the disappearance of a missing unaccompanied migrant minor but rather apply flexible standards, which causes additional confusion. Additionally, eight member states (Austria in cases where the asylum status is not yet decided, Estonia, Finland, Hungary, Luxembourg, Slovakia, Slovenia, Sweden) have used the disappearance of an unaccompanied migrant minor as a reason to withdraw their asylum application, with no additional action taken to grant their safe return (European Migration Network, 2018, p. 50). Owing to a lack of documents on the current legislation's state, it is unclear whether these practices have changed since then.

However, since the legislative adaption of less discriminatory frameworks has still not yielded reliable consequences on the work practices, the gap in reacting to the disappearance of EU-born children and children from other states remains a pertinent issue—therefore disadvantaging unaccompanied migrant minors despite the international legal documents promising equal treatment of all children. In Slovakia, for example, a study published in 2014 on their practices in handling unaccompanied migrant minors showcased serious shortcomings when handling missing incidents (European Migration Network, 2014). The nationwide system PATROS that is usually utilised in searching for missing people will not be activated (cf. ibid.: 41). Furthermore, the state does (or at least did in 2014) not provide any additional tools to help in the search for missing unaccompanied migrant minors, such as the use of alerts in the Schengen Information System or a hotline (cf. ibid.). In 2017, another study on unaccompanied migrant minors in Slovakia was conducted, highlighting the persistence of them going missing from shelters (Meszarosova and Obonova, 2018, p. 43). The development of policies and guidelines since then has not been published.

Yet, even if the disappearance has no consequences on the asylum status, perilous and opaque practices remain. In Germany,

for example, shelters may report an unaccompanied migrant minor missing right after discovering their disappearance—as is the norm in cases of German-born missing children—but depending on the specific shelter the child is housed in, a mandatory waiting period in reporting of 24 or even 48 h may be imposed. This leads to an even higher imbalance in the chances of recovering missing unaccompanied migrant minors since their fate is (partially) determined by the location and practices of the shelter that they are housed. Additionally, the German federal government has admitted the ongoing issue of unaccompanied migrant minors going missing while under state care, with 70,1% of the child protective service offices reporting missing incidents, adding up to 1.518 missing unaccompanied migrant minors in 2019 (Deutscher Bundestag, 2020, p. 6). Owing to the lack of a social network and elevated risks of being victimised by a hate crime or human trafficking, the risks connected to going missing can be even more severe for unaccompanied migrant minors.

It is true that efforts have been made by certain countries in addressing the growing numbers of unaccompanied migrant minors and minimising the risks contained. Italy, for example, is developing novel intervention models for the accommodation, integration and protection of unaccompanied migrant minors, which aim to go beyond the classical ones, but they are still in a pilot phase (Rania et al., 2018, p. 102). Moreover, while alert systems such as Amber alert have been in use for years—both in the US and the EU—research on their effects remain scarce. Cases of missing persons, especially missing children, receive a high amount of media attention, yet there is a lack of research within a European context on the child alert systems' effectiveness. An exception to that is Shalev Greene & Hedge's study on the usefulness of child alert systems in the Netherlands, UK, Czech Republic and Poland, which found that experts in the field agreed that the Internet and Social Media were rather effective in both raising awareness about as well as recovering a missing child (Shalev Greene and Hedges, 2016).

New insights from expert interviews
Methodology of the ChildRescue interviews. Through the course of the EU-funded ChildRescue research project on missing children, a total of 26 open-ended guideline-based interviews with experts from four different EU countries (DE, DK, GR, UK) were conducted. Owing to the exploratory nature of the research—which is linked to the lack of comparable research on the establishment and use of alert systems in Europe as explained above—a qualitative approach was favoured to ensure that the interviewed experts could express matters without being bound by categories. Hence, the used guidelines were designed with open-ended questions on the kind of information needed and the current processes in place, following the principles of expert interviews in focussing on the interviewees as representatives of their profession (Flick, 2011, p. 214). These interviews fell into two phases with a differing focus: the first 12 interviews were conducted as a pre-study to gain insight into the needs and issues when handling missing children cases. The 14 interviews that followed this pre-study were used to establish the crucial information for reacting to missing children cases, which was utilised as a base for developing the app and platform to aid in the faster recovery of missing children, found in section 'A new solution for the registration, protection and identification of unaccompanied migrant minors'. The interviewees were chosen to represent a vast array of key actors in handling different missing children cases and researchers specialising in the topic to gain insight into the state-of-the-art of academic and practical knowledge as well as represent experts from different fields. Therefore, various agencies were contacted in the four participating EU countries: Email

and telephone recruiting of interviewees were used alongside the participating missing children organisations of the ChildRescue project, who acted as gatekeepers for recruiting additional interview partners. To ensure a wide-reaching perspective on the issue of missing children, different actors were engaged, which led to interviews with stakeholders from specialised police units, child protective services, researchers on missing children, and specialised NGOs dealing with missing children generally or subgroups of missing children such as runaways or unaccompanied migrant minors. An English open-ended guideline with questions inspired by the pre-study results was devised and utilised in translated versions throughout all the interviews to generate comparable interview results. Eight of the interviews ($N = 14$) were conducted with different German stakeholders, such as police officers, youth researchers, specialised NGO staff working with street youth, and staff members from child protective services working with unaccompanied migrant minors. One interview was conducted with a UK police force member who oversees missing children cases. The remaining five interviews were conducted by the organisations The Smile of the Child and the Hellenic Red Cross interviewing staff members of their NGOs in Denmark, Greece and the UK to represent different EU member states' perspectives and their national protocols. The interviews were conducted via telephone to accommodate interviews with experts from different countries and lasted between 45 and 90 min.

The interviews started with a narrative incentive to describe their work practice in missing children using a (fictional or real) example case. After the initial narrative, which demonstrated the current as-is state, follow-up questions were designed to enlighten the decision-making process in professional responses to missing incidents and current best practices.

The results were utilised to identify crucial information that needs to be included in creating files of missing children in general, as well as distinguish certain pieces of information that should be prioritised in specific missing situations. A categorisation system for missing children was established based on the MCE system and confirmed by the results of the expert interviews, which serves to prioritise information that is essential to the child's situation.

Results from the interviews. Comparing the interview results from the different actors showed a consensus among the various actors on the importance of general information, such as the child's name or the place and time of disappearance, for all case types, as shown in Table 1. However, some more specific information can also be of high relevance to the missing child's situation. Therefore, Table 1 gives an overview of different aspects highlighted in the interviews as crucial information for either all cases or to understand the specific issues in certain types of missing children cases. For instance, in cases of missing unaccompanied migrant minors, the child's immigration status can influence their movements and their vulnerability to becoming victims of human trafficking. Furthermore, the context of the recovery site, e.g., a brothel, could indicate further victimisation or risk for other missing minors associated with the recovered child. The accumulated knowledge on the different situation of unaccompanied migrant minors compared to other missing children shall be discussed below.

Owing to the specific situation of missing unaccompanied migrant minors, some circumstances have been underlined in the interviews, namely the problematic nature of current processes, which put missing children in migration at a disadvantage, the general lack of interest in missing unaccompanied migrant minors as well as the decreased level of agency of these children compared to other missing minors. This ties back to the issues highlighted in the current research literature under section 'The

Table 1 Key information as identified in the interviews conducted by the partners.

The Smile of the Child	Hellenic Red Cross	Frankfurt UAS
General info (name, gender, phone number, nationality)	General info (name, gender, nationality)	General info (name, gender, phone number)
Age	Age	Age to determine the likelihood of runaway vs. kidnapping
Family situation	Immigration status	Family situation
Health status (substance abuse, disease, emotional and mental state)	Health status (mental state)	Health status (substance abuse; disease; emotional and mental state)
Time the child was last seen	Time of disappearance	Timing of disappearance
Key persons (family, friends, others)	Context of the recovery site (red-light district, border...)	Access to dating apps
Location the child was last seen	Intended location	Police warrant

distinctive situation of missing unaccompanied migrant minors in the EU' of this article as well as the gap in cleared cases identified in the German BKA data. The protocols for handling a missing unaccompanied migrant minor vary significantly in the different EU countries, further stressing the results from earlier research (cf. European Migration Network, 2020, p.3). Hence, there is a pronounced difference in the response to missing unaccompanied migrant minors and EU-born children. One interviewee, who works in a German shelter for unaccompanied migrant minors, described that the standard procedure for an adolescent that did not return at the arranged time at night was to wait until the next morning before the police were informed and further action was taken.

Also, the current use of risk assessment systems can put children without a parental guardian, such as unaccompanied migrant minors, at risk since they lack a party to voice concern over their disappearance and press the issue with overworked police officers. In the current UK system, a risk assessment will determine the next steps in the missing cases, with 'high risk' cases being pursued immediately, whereas 'no apparent risk' cases remaining on hold for a few days to wait if the child returns on his own accord. Although the risk assessment process offers a chance for police officers to grasp their workload better and prioritise cases where the missing person's life might be in danger, there are some inherent issues with this process. Aside from the fact that mislabelling of a case might occur due to wrong or incomplete information on the missing person, a 'low risk' classification is inherently misleading. Even in a missing case where the child has run away before, a dangerous situation can occur, as pointed out by an interviewee from the UK police force, who stressed the problematic nature of classifying repeat runaways as less dangerous, since it could turn into a life-threatening scenario every time (I8UK).[2]

Additionally, the classification of missing persons in the categories depends on the perception of police officers, which can lead to a neglect of cases with parents who show no interest in their children or who are not present, as in cases of unaccompanied migrant minors. Children in care, such as unaccompanied migrant minors, thus, suffer from a higher risk to be classed in this category: 'Because of the sheer numbers of particularly missing children, missing children from care, those bigger forces I think have been attracted by the 'no apparent risk' category' (I8UK). This is highly problematic since the disappearances of unaccompanied migrant minors are typically international in nature. The difficulty of relocating the child increases over time as their movement parameter also grows. In instances where unaccompanied migrant minors disappear with the help of smugglers, their decision-making abilities might be compromised, as pointed out by this German expert working with unaccompanied migrant minors:

I see a difference between the youth, who have a migration background and are refugees, and those who have been socialised in Germany – or Europe. The refugees are often directed by the smugglers and don't make their own decisions. Directed by the smugglers and also the parents, who tell them where to go to. And they are very submissive. They don't make a free decision from my point of view.[…] the others are more self-determined in their actions. There is often a drug dependency or a borderline disorder in the foreground (I4GE, translated by author).

However, aside from (adult) smugglers, other adolescents may also influence the decision-making process of unaccompanied migrant minors, who go missing since they travel in a group:

And there's a youth who display pubescent behaviour due to the dangerous situation they are facing. Who is being dragged along by other adolescents and think it's great to be so independent.[…]And we don't have the possibility to create an offer here that entices them to stay (I4GE, translated by author).

This showcases both the issue of offering suitable services to unaccompanied migrant minors that will entice them to stay and the looming problem of a lack of agency that can lead to further victimisation due to the specific situation of unaccompanied migrant minors. Additionally, due to the lack of family ties, the children tend to be overlooked in both official data—as pointed out in section 'The distinctive situation of missing unaccompanied migrant minors in the EU' of this article by the use of the German BKA data as an example—and the usual state response to ensure child welfare. Unaccompanied migrant minors suffer from an increased risk of going missing and being victimised in the process due to several reasons, but not the least, also because there is an overwhelming lack of interest in them, as showcased by the example from the interviewee who works in a German shelter for unaccompanied migrant minors:

I had a first interview with a 12-year-old boy two weeks ago, and he was very shy and looked dishevelled.[…] This is a boy who was already in care in his home country and travelling through Europe for at least two years now. And he isn't registered as missing anywhere. Nowhere. In no other country (I4GE, translated by author).

When looking at the immense lack of knowledge about unaccompanied migrant minors before and during their disappearance, it is hard to ignore the issue of lack of communication between international actors in the field as well as the seeming disadvantage these children face in the current system when compared to missing children from within the EU. The information gathered in the interviews conducted has thus reinforced the issue for unaccompanied migrant minors that has

already been discussed in earlier research and thereby further underlined the need for an innovative solution to cracking open the black box; the disappearance of unaccompanied migrant minors and connecting different stakeholders to ensure that the gap among missing children is closed.

A new solution for the registration, protection and identification of unaccompanied migrant minors

Methodology for the missing unaccompanied migrant minors' investigation cycle. Building on the previous analysis, we suggest a new solution to meet these crucial challenges and cover one of the most significant issues related to the refugees' crisis; the disappearance of unaccompanied migrant minors and the additional difficulties in identifying them. This methodology aims to seamlessly apply to all missing children cases, making, though all the necessary adaptations to also address the most challenging and distinctive of them, the unaccompanied migrant minors going missing. Towards this goal, a novel, efficient missing children's investigation cycle is proposed that integrates citizens and society with traditional actors in missing children's investigations; mainly missing children response organisations, organisations operating hosting facilities, along with volunteer networks, public administrations, and in-field search and rescue teams. Response organisations are all NGOs that work towards the prevention and protection of missing children. Organisations that manage hosting facilities, such as the Red Cross, are organisations that host and offer protection to migrants and refugees and, along with their other processes, handle cases of unaccompanied migrant minors going missing, a scenario, which is far from rare as explained previously.

Social theories and qualitative research have been combined with novel technologies towards addressing this critical societal challenge. From a technical perspective, the solution consists of a web platform, which is only available to the organisation's users, and a fully operational mobile app developed in the context of the EU-funded project, ChildRescue.

The result is an uninterrupted cycle of information flow and communication between all stakeholders achieved by identifying and addressing the requirements of the relevant organisations. In particular, The Smile of the Child in Greece, Child Focus in Belgium and the Hellenic Red Cross actively participated in developing the solution to use it afterwards. Additionally, MCE, being the umbrella organisation of all EU missing children response organisations, is a leading participant contributing its broad network and extensive experience in communicating activities.

To ensure data protection, different roles with varying degrees of rights and access to information have been implemented, which the organisations can assign to different users. Figure 2 depicts the proposed four (4) phases of the missing children investigation cycle that follow the official report of the disappearance, as well as the expected stakeholders that participate in each of them. The methodology aims to intervene

in all four phases, proposing alternatives and additions in the established stakeholders' processes.

The distinctiveness of the case of unaccompanied migrant minors is clear from the methodology's onset since, for their case, the preparation phase starts before a potential disappearance, at the time the minor arrives at a hosting facility. The reason is that they can be considered, by the organisations taking care of them, potentially missing children, given the alarming frequency of such cases. Indicatively, 31% of missing children in migration reported were unaccompanied children, according to MCE's official records facilities (MCE, 2020, p. 6). So, if this measure is deemed necessary and explicit consent is given by the minor, the platform is used to create a profile for them and verify their presence at the facility. Currently, when these children go missing, the lack of information on them decreases the chances of a fast and safe recovery.

Special care has been taken to protect these children's privacy in awareness of their increased vulnerability compared to other children. Therefore, the platform does not provide itself direct access to the authorities to ease these children's fears that their data may be used for their persecution. Nevertheless, access can be provided indirectly depending on applicable legal requirements. Hence, if a child goes missing, any new information on the child that becomes available, such as the place and time last seen, is introduced in the platform by the appointed case manager. The platform then enhances this collected information by applying automatic profiling and prediction methods, the preliminary findings of which can be found in a different publication (Michalitsi-Psarrou et al., 2019). Their purpose is twofold: on the one hand, to create a case profiling and to associate it with similar past cases, and on the other hand, to identify and evaluate potential Points of Interest (POIs) to search for the child. By the end of the preparation phase, a multilayer - personal, psychological, social—profile of the missing child or the unaccompanied migrant minor is available.

At the coordination phase, new models of collaboration between the missing children response organisations are enabled. For each new case created, the platform offers a collaboration space that allows instant messaging between the case managers and the engaged team members. The collaboration spaces can help organisations build a team for an investigation more quickly than the current time they need for team formation per case after a report of a missing child has been filed. As indicated by repeated bilateral meetings and interviews with the participating pilot organisations, this average time is now more than one hour, pointing out that substantial time from the actual investigation is missed and the missing child placed at risk.

In the case of unaccompanied migrant minors, when a child goes missing, most countries and relevant organisations do not automatically engage in search and rescue activities, unless this is for his vital interest, as in cases of emergency (e.g., a shipwreck, a natural disaster). To address this issue, apart from the child's early registration and the identification of minors with a high
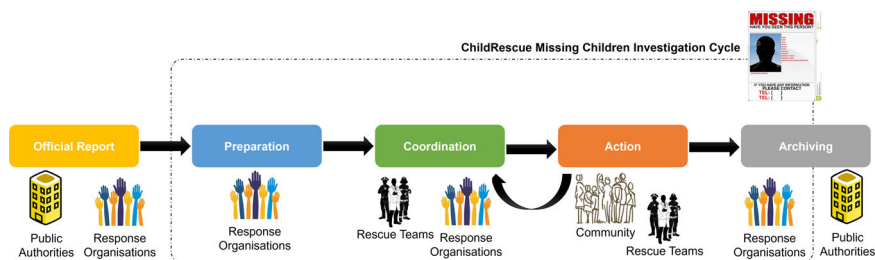

Fig. 2 A new missing children investigation cycle, structured in four (4) phases—preparation, coordination, action, and archiving—that follow the official report of the disappearance. The engaged stakeholders on each phase are also shown.

probability of going missing, easy data sharing among facilities of the same organisation, even across borders, is offered. This is particularly crucial due to the high frequency of children transfers between facilities. To ensure the protection of their personal information, the data are, however, only shared within the same organisation and not given to other actors, like state authorities.

On top of that, an 'intelligent' search engine that allows automatic retrieval of existing children records with similar-sounding registered names is provided. It is an essential functionality for operators handling unaccompanied migrant minors' cases, as it is common for European handlers to register the children's names from non-European countries differently. Through that, the frequent issue of having multiple records of the same child, which could also result in an erroneous perception of a child's disappearance, is addressed at the level of the organisation.

At the action phase, if decided by the organisation handling the case, communities are actively involved. During an active investigation process, mobile alerts, sharing public information about an active case, are broadcasted to all users that have the mobile application installed on their mobile phones and are currently within a predefined area around a POI, respecting user's privacy by using geofencing. Geofencing is a technique that allows for the activation of mobile notifications only if the user enters a specified area, without informing the application provider—that is, the company who hosts and develops the app —of the devices receiving the notification (Garg et al., 2017). The initial POIs may be the place the children were last seen and related places of interest, as identified by the testimonies of their environment or extracted by the analysis in the preparation phase. With the advent of time, new evidence may emerge from users or other sources, which may be translated into new POIs indicating new mobile notifications for the public

Only the bare minimum of the children's data is disclosed to the public to protect their privacy since we cannot turn to their anonymisation, given that they aim to facilitate a child's identification. Therefore, no additional information is published other than the current practices, but the control over the dissemination of this information and its complete deletion is strengthened. Consent monitoring functionalities have also been implemented to ensure data erasure upon consent revocation.

Finally, in the archiving phase, once the case is closed, the web platform provides easy handling of a case's closure in a secure and privacy-respectful manner. The platform applies pseudonymisation techniques, compliant with the GDPR (https://eur-lex.europa.eu/eli/reg/2016/679/oj) to protect PII (Personal Identifiable Information) of the archived cases. Anonymisation policies are enforced upon activation of the right to be forgotten. Therefore, when data expire or consent is revoked, this methodology allows either removing or fully anonymising the pseudonymised data.

In any case, at the end of each investigation, all relevant case data are automatically deleted from the user's devices. Hence, the control over the dissemination of pictures and information on missing children is tightened compared to flyer campaigns that well-meaning members of the public can redistribute after the child has been recovered, thereby offering improved data protection to children who have once been missing.

The solution's procedures intend to be a driver of change by assisting the already involved parties and offering added value, in a non-intrusive manner, in parallel to the existing organisations' mechanisms, under the business process management (BPM) (Dumas et al., 2013; Vom Brocke and Rosemann 2015) and change management principles (Dumas et al., 2013, p. 363; Mento et al., 2002). BPM occurs when the existing processes are slightly altered to achieve the same results in an optimised

manner. At the same time, change management supervises how the human capital reacts and adapts to those changes. Different privileges and access rights per user ensure data protection. Each organisation decides the different access rights for its users, rendering data sharing among facilities and organisations feasible upon decision.

Preliminary findings. The above methodology has been tested by three pilot organisations, as mentioned before, The Smile of the Child in Greece, Child Focus in Belgium and the Hellenic Red Cross, in two piloting phases. The Hellenic Red Cross, in particular, was focused on the discovery and identification of unaccompanied migrant minors in the EU. Its aim by its participation was to unlock new ways for the effective handling of their disappearances and build on the potential to predict and even prevent them while respecting the IASC guidelines (https://interagencystandingcommittee.org/).

The following aspects were tested and evaluated: (a) registration of unaccompanied migrant minors, (b) creation of their list within each facility centre for a full overview of the minors supported by the organisation, (c) early detection of possible absences on facility-level by taking regular presence, (d) ability to identify missing children in case of emergencies, (e) facilitation of volunteer deployment and coordination during an emergency, (f) ability to serve parallel investigation of missing children, and (g) provision of an overview of the investigation procedure with real-time feedback on a map.

For the evaluation of the solution in both phases, a total of 74 participants were included in all three piloting organisations, 21 of which were employees and volunteers from the Hellenic Red Cross. During both piloting phases, the employees participating in the exercise were asked to rank the usability of the platform and app on a scale from 1–5, with '1' being 'Very bad' and '5' being 'Very good'. Furthermore, an additional survey was carried out on the effects of this solution on their work processes. The outcome showed their appreciation of the solution in all the areas examined. While all three piloting partners also work on cases of missing unaccompanied migrant minors, the data from the Hellenic Red Cross shall be highlighted for this article since their practices solely focus on this group of missing children.

Table 2 presents summary statistics, namely the mean and standard deviation, for the results of the usability rating during the second piloting phase for Hellenic Red Cross. Top-level managers from the Hellenic Red Cross were asked to participate. As an overall outcome, all participants stated that they could see the applicability and the effectiveness of the solution in real-time, especially on what concerns the deployment of volunteers and the quick response to missing cases.

Three additional surveys were conducted to evaluate the solution's functionalities further; the first two surveys were

Table 2 Assessment of the usability of the solution for the Hellenic Red Cross during the second piloting phase using the median value and the average absolute deviation of the answers ($n = 5$).

Item	Median	ad
Organising volunteers	4	0.33
Recruiting new volunteers	4	0
Timely response to missing cases	4	0.2
Increasing the speed of recovery of missing chil-dren	3	0
Matching old similar cases to new cases	3	0.2
Establishing relevant locations of missing chil-dren	3	0

conducted during the piloting exercises. The last one was conducted after the solution was implemented into work practices. The additional surveys highlighted the great potential impact of this solution on the workflows in this specific subgroup of missing children. The estimated average time between the reporting of the disappearance and the location of the missing child showed a substantial improvement, cut down by nearly 60% from the first survey. The average time for the formation of search and rescue teams has also improved. Additionally, the average time needed to inform citizens of new cases has dropped by nearly 40% compared to the first survey.

Apart from these positive indications, the participants also expressed concerns about the solution's compatibility with their current workflows directed by the Red Cross. They have to adhere to strict protocols that most of them are common on an international level. This fact might make some features less useable for this specific organisation. However, the overall essential functions were welcomed as an additional tool for increasing the organisation's efficiency. Furthermore, the guardianship of unaccompanied migrant minors in Greece remains a crucial issue. Social workers working with the Red Cross shelters underlined that data validation should probably be on a state level. This was a limitation that the other two piloting partners did not face, unlike the general changes in workflows due to the Covid-19 pandemic, which further skewed the results of the surveys.

To conclude, the overall experience from both piloting exercises was positive with good potentials for future use under certain conditions, which mainly refer to the strict protocols that render the solution's adoption possible only horizontally for the whole organisation internationally, with the difficulties that this entails. Additionally, the small sample size of the evaluation rounds does not allow for generalisability of the results, but they can be considered very promising preliminary findings.

Finally, it has been highlighted as a useful continuation point that, especially for unaccompanied migrant minors, care should not end with their discovery. Such an initiative should be accompanied by a protection follow-up mechanism that will ensure the best interest of the unaccompanied migrant minors.

Discussion and conclusion

Going missing carries an imminent threat to the mental and physical safety of the minor in question. Especially for missing unaccompanied migrant minors, who disappear with a frighteningly high frequency and whose recovery often starts delayed, the increased risk of serious victimisation should be counteracted time-efficiently. The solution proposed in this article holds the potential to stop serious crimes and prevent children from falling off the grid. Through the potential to connect actors within the NGO as well as different international actors, missing unaccompanied migrant minors can be identified easier. Additionally, due to the location-based distribution of alarms to the public, data protection is increased compared to the current methods of spreading information via social media or flyer campaigns, which leaves less control over the sharing of such information.

Despite these advantages, there are also some risks associated with this solution's functionality. For instance, while the toolkit is open to all types of cases, the prioritisation of information is based on the correct classification of the case (for example, an abduction case might be wrongfully classified as a runaway leading to different POIs and therefore ineffective alerts). While this risk can hold some serious consequences, such as focusing recovery efforts on the wrong location, the current system of classing cases according to a risk assessment is even more dangerous since it can lead to no action taken at all.

Additionally, the possibility to create profiles for all unaccompanied migrant minors in shelters even before they disappear might be seen as problematic since it can have a stigmatising effect and invite breaches of data security. To counter these concerns, strict data protection protocols have been put in place, as analysed before. All sensitive data are stored in a secure database with no access to external connections. Additionally, the explicit consent of the minor is required for the data to be stored before a missing incident. However, the concerns of further 'othering' an already vulnerable group of the population should not be dismissed. This specific feature of this solution will be carefully inspected in the work practice to ensure no abuse will occur.

By the time of the writing, the solution presented has already been used in 40 real-life missing children cases in Belgium by Child Focus, of which 32 have already been found and 30 real-life cases in Greece by The Smile of the Child, of which all were found. In parallel, the Hellenic Red Cross has been using it in 19 real-life cases of unaccompanied minors in hosting facilities. Work towards further improving the solution is still ongoing. Having a fully functional technical solution, the focus is now on its best exploitation for the children's best interest. For example, there is significant research on the necessity to improve missing children appeals and ways to accomplish that (Hunt et al., 2020), which should be considered by the engaged organisations' social workers when creating new public appeals using this solution.

Although the presented solution can serve as a practical tool to address some of the issues of the lack of knowledge on unaccompanied migrant minors after they have gone missing, it is not in and of itself the solution to the black box that continues to be the high numbers of disappearances of unaccompanied migrant minors. Further research with a participatory approach is desperately needed to shed light on the exact circumstances of their disappearance, motivation, and push and pull factors. Gaining insights into the gap between EU legislation and discriminatory practices is advised to make meaningful change and ensure the equality and safety of all children residing in the EU. The introduced insights and tools can thus be seen as a starting point for further research as well as inspiration for meaningful change in social policies to address all missing children equally. In order to end the discriminatory practices against unaccompanied migrant minors, it is vital for the EU member states to ensure that their practices are homogenised, and remaining gaps between the disappearance and reporting of unaccompanied migrant minors are addressed immediately. Further, understanding the reasons for their increased numbers of disappearances can prove vital in preventing these incidents in the future, thereby decreasing these children's risk of being victimised through sexual abuse, human trafficking or even death.

Data availability

The datasets generated and/or analysed during the current study are not publicly available due to privacy and ethical restrictions but are available from the corresponding author on reasonable request.

Notes

1 In the context of this article, 'children' shall be defined in line with the UN Convention of the Rights of the Child as any person under the age of 18 (cf. UN, 1989, article 1).

2 For this article, the conducted interviews were numbered chronologically with the added country abbreviation at the end. This has been used to uphold the anonymisation of the data set, while also referencing the source interview.

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Competing interests
The authors declare no competing interests.

Ethical approval
This work has been co-funded from European Union's Horizon 2020 research and innovation programme under the ChildRescue project and was approved by the European Commission. An Ethics Advisory Board was also set up for the project, comprising of selected, based on their experience and expertise, external experts, to monitor and support tackling ethical and data privacy issues. The authors confirm that all research was performed in accordance with relevant guidelines/regulations. Research involving

human research participants was performed in accordance with the Declaration of Helsinki.

Informed consent

Informed consent was obtained from all participants.

Additional information

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