Domestic geological tourism - a source of income for local communities and one of the areas of development of geological education

V.A. Nesterovskyi, V.V. Perekheida (Taras Shevchenko National University of Kyiv), O.L. Shevchenko (Ukrainian Hydrometeorological Institute, Ukraine)

SUMMARY

The presence of attractive natural objects and geological monuments for tourism in local communities will provide additional jobs and may interest and inspire graduates of local schools to obtain geological education at the Institute of Geology of Taras Shevchenko National University of Kyiv. For the development of such a startup it is necessary to conduct an inventory of geological monuments available for mass and exclusive visits, as well as to categorize them according to a specially developed list of criteria and features. Geological tourism should be divided into mass, exclusive and scientific (as an element of scientific - practical conferences). The geological community of higher education institutions should play a key role in the scientific support of geological tourism, training and development of routes.
**Introduction**

The reorientation of supporters of foreign travel to domestic tourism in Ukraine is becoming an unconditional alternative against the background of increasing uncertainty with the expiration of quarantine related to Covid-19. One of the areas of such tourism, which allows to disperse tourists into small, family groups "by interest," may be geological tourism. Currently, due to quarantine, the monthly exhibition "Gems of Ukraine," which previously took place in Kyiv, have been suspended. Therefore, for many stone lovers and collectors who have seen at exhibitions mostly processed precious or decorative stones, geological tourism can be a dedication to the world of natural stone, a revelation that reveals the still incomprehensible mysteries of the origin of minerals and gems. For local communities, such a startup will be an additional source of income, which can be used, including to combat the epidemic. The presence of attractive natural objects and geological monuments for tourism in local communities will provide additional jobs and may interest and inspire graduates of local schools to obtain geological education at the Institute of Geology of Taras Shevchenko National University of Kyiv.

**Idea and content of project**

First of all, for the development of such a startup it is necessary to conduct an inventory of geological monuments available for mass and exclusive visits, as well as to categorize them according to a specially developed list of criteria and features. Such objects can include interesting geological outcrops, abandoned quarries, caves, mineral water springs, lakes with mineral formations, etc. Some of them may be related to paleontological or archaeological finds, which will help attract an additional contingent of tourists interested in studying the history of Ukraine. All these objects must be classified according to scientific significance, i.e., obviously they can be of world, state, or local importance. The level of their availability and the illustrated multi-volume edition "Geological Monuments of Ukraine" (Geological..., 2006) will depend on this. On unique natural monuments of world and national importance it is necessary to establish protected places of valuable finds, which are currently in museum exhibitions, it is desirable to arrange memorials (Nesterovskyi and Derevs'ka, 2015). For example, the installation of such a sign in Holosiivskyi district, where a unique mammoth skeleton was found in the 1940-s, will not only add a new tourist attraction to Kyiv, but also increase the number of visitors to the Geological Museum of Taras Shevchenko National University of Kyiv, where this skeleton is stored and exhibited. Within large cities, geological objects can include monuments and buildings made of original or well-known iconic natural materials of Ukraine. Engineering and geological structures can also be interesting: drainage galleries, galleries, retaining walls, artificial outcrops, places of unique paleontological finds, such as the already mentioned lake on Holosiivska Square in Kyiv, where the only practically complete mammoth skeleton in Ukraine was found. The list of geological objects of priority visit should include only those monuments that, according to a set of certain features, meet the requirements for safe mass or individual visit and protection against damage and destruction. Near such facilities must also be equipped with parking spaces for vehicles, food, personal hygiene, recreation. According to our estimates, there are no more than a dozen such facilities in Ukraine today. If we ensure their profitability from tourism, it will be an effective advertising and incentive to "promote" the objects of the second group, which do not yet have the necessary support infrastructure. After substantiation of the network of geological interests, it is necessary to pass the pre-startup stage with the review of prototypes and the choice of a universal specialized "working prototype." Individual business plans should be developed for individual objects. In the future, a public version of the product is being developed, which requires a stage of "mass" media advertising with support on the website.

Eventually, based on demand, souvenir shops will appear at such facilities, which will increase the importance of the tourist facility and provide new jobs. For example, our Institute has developed several well-founded business projects for the organization of small enterprises for the production of souvenirs and jewelry made of onyx and decorative flint from Podillya. (Drozd, 2016; Ostryans'ka,
In this region, within the immediate vicinity there are many interesting natural outcrops and geological monuments (Nesterovskyi and Mokiyets, 2009) (fig. 1-3).

Figure 1 The hill on the Tovtrov ridge, Khmelnychyna

Figure 2 Carbonate onyx formation at Beg. Kuzheleva in Khmelnytsky region

Figure 3 Native formations of carbonate onyx at the manifestation "Lysets", Khmelnytsky region

A business plan has also been developed to promote tourist excursions to the sites of finds of unique fossilized Ediacaran (Precambrian) fauna in the area of Transnistrian Podillya (fig. 4). There are several aesthetically attractive objects in this area of complex touristic interest, but unfortunately they don't provide even the minimum necessary infrastructure at the moment (Ostryans'ka, 2014).

Exclusive geological tourism should be understood as guided excursions in small groups of 2-4 people on objects inaccessible to mass tourism - caves, galleries, catacombs, canyons, steep mountain slopes, requiring special equipment or training. Organized and specially equipped network of geological monuments can also become an integral part of scientific conferences in geology and other fields of natural sciences. This obliges the development of scientific geological tourism. This type of tourism is not necessarily associated with specific, especially valuable or "closed", signs of their vulnerability, objects, but necessarily involves a deeper, specialized presentation of the geological monument. Of course, such excursions require professional support, which will encourage local youth to specialize in education.
Abroad, in particular in Great Britain, during environmental conferences visit recreational facilities, have been successful measures to implement renaturalization. These are areas of former mine workings (quarries), cleaned rivers and drainage drains. In the case of stratigraphic hole and hydrogeological wells not lined with metal columns, which were passed through the massive rocks, it will be interesting to have an "excursion into the bowels of the earth" during immersion in the well of a special video camera. Such images are amazing in the presence of crystals, karst caverns, various rock inhomogeneities, paleontological remains, etc. in the walls of the trunk. The current practice of venture investment involves several stages of financing startups, in each of which the host company raises enough funds to support growth and achieve the next round of investment. As the attracted investor will receive income from the increase in the value of his share in the company's capital, it is expected that such local companies will grow several times between investment rounds, which makes the startup attractive to a new investor. The founder of a startup - a company (firm) that undertakes the organization of geological tourism at the local level and its initial investment, most likely should be a local union, activists of the local community. From local funds organizers arrange a specialized hotel, one of the premises of which should be a museum of local geology, which will contain the brightest and most representative samples of minerals and rocks, photos of local outcrops, quarries, and landscapes. Here one can watch videos shot at other times of the year at local geological sites. Access to geological monuments and interesting tourist geological objects should be controlled by local communities and responsible persons.

Excursions to objects should be multifaceted, with a combination of stories, video views, training (Nesterovskyi and Derevs'ka, 2015), acquisition of practical skills, shopping, etc. At the same time, outcrops with valuable specimens should be isolated, and for those who wish to allocate less important areas for "search," providing them with geological hammers and other tools for collecting specimens. In the interest of the participation and development of the project and the company, the business sponsor, according to the rules, usually gets a seat on the board of directors and the opportunity to block the decisions of the founders, which he considers unreasonable. This may not be in line with the plans of the founders and developers of the project and will lead to a conflict of interest. Analysis of the country's investment market shows that at the stage of "idea" only a third of investment companies are ready to invest, when there is a business plan, product prototype, availability of pre-orders - the number of investor companies more than doubles. In addition to crowdfunding - platforms and investment funds, startups also have the opportunity to raise grant funds for the development of their projects. So in Ukraine there are competitions of startups with a prize
fund as a grant. For example, during the three years of the Vernadsky Challenge hardware startups competition, the winning startups received a total of UAH 5 million in grant funding. Obviously, even in the initial stages, many different specialists can join the project development: geographers in the field of tourism business, economists, designers, artists, IT specialists, etc. On the basis of this project, various craft areas can be developed. Many objects for geological tourism are located in Podillya, in Tovtri of Khmelnytsky and Vinnytsia (Nesterovskyi and Ostryans'ka, 2010) (fig 1-4). However, the disorder and accessibility of some of them for "wild" tourists can eventually lead to the loss of unique natural monuments.

Conclusions
Domestic geological and exclusive scientific tourism can be a significant source of income for local communities, which will also provide jobs and inflows of students to higher education institutions for geological specialties. In addition, streamlining, monitoring, and protecting geological sites by local communities will extend their existence and preservation for future generations. Guides of geological tourism can be local residents - graduates of the Institute of Geology. The organization of such commercial projects should begin with explanations of the attractiveness of geological monuments for local governments, which in turn will be In the future, graduates will encourage local youth to professional study of geology. Specialized educational institutions will return to their homes, where they will be able to develop this area. Geological tourism should be divided into mass, exclusive and scientific (as an element of scientific - practical conferences). The locations of objects can be the same or close. The geological community of higher education institutions should play a key role in the scientific support of geological tourism, training and development of routes.

References


