

THE SWISS CONFEDERATION, THE TRUST AND THE TAXATION OF IMMIGRANTS

Marco Giacomo Bonalanza¹

Switzerland and the Hague Convention

Switzerland has ratified the Hague Trust Convention, thus recognising the trust as part of its tax law and drawing a distinction between residents and non-residents. The main tax-related features of a trust are its immediate establishment and the permanent residence of its actors. The question is what will happen to the trust taxation when non-residents become residents? In particular, is there any difference between the “ordinary” newly resident beneficiary and the one benefiting from a “lump sum taxation”? In this article I examine these questions.

The Swiss Confederation is a civil law jurisdiction, well renowned for being an independent financial centre and for constantly and consistently offering high quality financial, corporate and trust services.

At present, where the requirements of security and public economy on the one side, and confidentiality and financial protection on the other side clash, it is not surprising to see how this country has tried and succeeded in finding a tool able to combine the contrasting demands for control and confidentiality.

Switzerland ratified the Hague Convention on the Law Applicable to Trusts of 1st July 1985 with effect from 1st July 2007.

This ratification is, among other things, the result of thorough research and the measured, thoughtful approach of the last few years, aimed at understanding the

¹ Marco G Bonalanza is an independent Step-certified Trustee based in Zug, Switzerland, and active both in that country and in Italy with his own Trust Company, Aquilon Gmbh. His practice dates back more than twenty years, most of them dedicated to trusts. His best area of expertise and considerable experience covers the entire range of matters concerning the creation, management and dissolution of common law trusts in civil law jurisdictions, as well as consulting in trust-centered litigations in both civil and common law countries.

main essence of the trust and including it in the legislation of the country in compliance with its main principles.

Those operating in the business of trusts will probably agree that the best feature of this instrument is its flexibility that enables it to meet the specific needs of the settlor.

It is not surprising, therefore, to see how the main worldwide Financial Authorities (although very differently from one another) are finding it difficult to define and develop a clear legal framework for the trust that complies with the fundamental legal principles and that can also be concretely implemented.

The neighbouring Italy, unfortunately, stands as an example of this difficulty. Here, the Convention was ratified on 1st July 1985 (implemented through law no. 364 of 16th October 1989 and entered into force on 1st January 1992): however, today the provisions concerning trusts are still controversial, inconsistent and often, even, illegitimate.

Switzerland, thanks to the aforementioned measured approach and the experience of neighbouring Italy, seems to have chosen a more coherent path, where a legal framework for the trust was clearly defined at the same time as ratification.

After thorough research conducted among the main fiscal administrations and operators to investigate the current trends and the legal practices related to the trust, on 22nd August 2007 the Swiss Tax Conference (“STC”) published Circular no. 30. This was followed about seven months later, on 27th March 2008, by Circular no. 20 issued by the Swiss Tax Authorities (“STA”), which is essentially identical to Circular no. 30 and adopts its views on matter of direct federal taxation and withholding tax.

Circular no. 30 has in our opinion managed to provide a coherent legal framework for trust taxation, thus allowing a certain stability and a legal certainty that is too often difficult to find.

As it normally happens in these cases, though, the risk is to excessively simplify the most complex features of the trust that, among other things, make it the exceptional instrument that many professionals deal with on a daily basis.

However, the Circular still remains a very good starting point because, despite such risk of simplification, it constantly refers to the main legal and fiscal principles already in force, thus representing a very good guideline for the most difficult cases with which professionals working in this area constantly need to deal.

Because of the new features brought in by the ratification of the Convention, and due to the limited number of cases that prevented further studies in the past, the

main references for this subject matter are the documents mentioned above, combined with some theory. As for the casework, it is still quite limited and not relevant for purposes of taxation of the trust.

The taxation of the trust is almost completely administered by the federal state, except for those aspects that are not subject to tax harmonisation, like, for instance, inheritance or donation tax rates and relative definition of the degrees of consanguinity.

Standard Taxation

I intentionally avoid any comments or analysis with regard to the text of the Federal Decree ratifying the Convention, although it did introduce a wave of positive aspects. From now on, for clarity and consistency purposes, we will therefore solely refer to the aforementioned Circular no. 20.

When analysing the Swiss context, we need to consider the federal direct taxation, the withholding taxation, the gift taxation, and, with regard to foreign residents, the international tax conventions, and namely the agreement with the EU concerning taxation on savings income.

As a general principle, we must first of all observe that Swiss tax law does not recognise the trust as a fiscal subject because it lacks legal character; under this view, Switzerland differs greatly from other jurisdictions, like Italy, for instance, that, although not admitting their legal character either, it does levy taxes on trusts. Consequently, due to the nature of the current Swiss tax system, it is necessary to attribute the trust funds to someone, either to the settlor or directly to the beneficiaries whenever possible.

In any case, and due to their special relationship with the trust funds, trustees are not taxed on these assets, but only on the fees they receive for the trust management, in compliance with the most common tax principles.

With regard to Circular no. 20, it should be first of all noticed that, consistently with the generally accepted principle of prevalence of substance over form in fiscal matters, it categorises trusts unlike legal analysts would normally do: namely, there is a considerable difference between the definition of “revocability” commonly used in the legal world and the one provided by the authors of the Circular. For taxation purposes, therefore, an irrevocable trust will be treated as revocable if the settlor is also a beneficiary or has any controlling, although not intrusive, influence over the trust assets.

Furthermore, the Circular summarises the endless types of trusts into three set categories that comprise all the possible combinations. These are the “revocable”,

the “irrevocable fixed-interest” and the “irrevocable discretionary” trusts.

Within the irrevocable and discretionary category, there is a further, less evident distinction based on the domicile of the settlor when establishing the trust. It is not clear, though, whether the domicile is also relevant during the distribution of trust funds. Based on the fiscal principle of “substance over form”, the author specifies that the establishment of the trust in fact refers to the distribution of its assets; this event, although legally and conceptually different, could take place at the same time of the establishment, or in a later moment, or even in separate stages. The Circular is in fact based on the idea that there will be no further distributions after the first one, and it does not investigate further.

For taxation purposes, therefore, the Tax Authority mainly refers to these two categories – revocability (as defined by the Circular) and irrevocability. Revocable trusts are considered “unable” to change the state of things and, consequently, they are treated as tax-transparent, as if no trust was created by the settlor. With the irrevocable fixed-interest trusts, all the income is transferred to the beneficiaries, and, according to the STA, they will pay income tax on the portion of assets to which they are entitled. With the irrevocable discretionary trusts, finally, the taxation is different depending on whether the settlor is Swiss resident or not when establishing the trust; as mentioned above, this stage is not consistently defined within the Circular.

Before moving on it is important to stress that “revocability” has a different meaning from the one usually accepted by the trust community. The trust is therefore defined by a list of evaluation criteria offered by the Circular and not by a decision of the settlor during its establishment. When the settlor continues to have controlling influence over the assets of the trust, this is *de facto* considered revocable from a tax point of view, despite the fact that a legal analyst would define it as irrevocable. However, there are also some similarities between the two definitions, for instance, in the cases when, upon establishment of an irrevocable trust, the settlor decides to keep to him or herself the right to terminate the trust.

We are certainly dealing with a complex matter, about which many theories have been developed within the Swiss community without yet reaching a conclusion. Substantially, the Circular provides the following definitions of trust and relevant solutions:

- Revocable trust (*de facto* and upon analysis of its act of establishment)

In this trust, the wealth is considered not transferred and is therefore not subject to taxation during the allocation stage. The trust assets and income still belong to the settlor and they will be taxed regularly as part of his or her wealth and income.

Distributions to beneficiaries will, therefore, be considered as donations and subject to gift tax according to the degree of consanguinity and the rates established by each canton. The same applies to the distribution of the remaining income to the beneficiaries after the termination of the trust.

- Irrevocable fixed-interest trust

This trust is irrevocable in name and in deed (unless otherwise stated by the establishment act); in this case, the beneficiaries are entitled to the income deriving from the trust funds.

According to the Circular, this is a case of direct transfer of funds to the beneficiaries and therefore the gift tax applies according to the principles stated above.

During the life of the trust, the beneficiaries will be taxable on their fraction of assets and income. If that fraction cannot be determined, the allocations will be capitalised and taxed upon termination of the trust.

The peculiarity of this type of trust is that the income that derives from it is tax-exempt if the beneficiary can prove it constitutes a capital gain rather than income (see Art. 16(III) of the Federal Direct Tax Law).

- Irrevocable discretionary trust

In a trust where there is not a defined beneficiary receiving the wealth that derives from it, the transfer of assets is not recognised. The solution adopted for revocable trusts, therefore, also applies here, although for totally different reasons.

The irrevocable trust, as it is defined by the Tax Authority, also falls within this category, although it is neither discretionary nor fixed-interest and has clear beneficiaries that are only entitled to wealth upon termination of the trust.

The domicile of the settlor during the establishment of the trust is therefore relevant both for the irrevocable discretionary and revocable trusts. In both cases, if the settlor is domiciled outside Switzerland and the beneficiaries are Swiss resident, the trust will be tax-exempt in Switzerland during its establishment.

According to the Circular, in the revocable trust there is no transfer of wealth, therefore nothing changes in the economic situation, regardless of whether the settlor is Swiss or foreign resident. On the contrary, in the case of the irrevocable discretionary trust, the STA provided an exception and decided that “the income cannot be attributed neither to the settlor nor to the beneficiary”. This means that whenever the settlor transfers money to the trust, and therefore to the trustee, this is

treated as a donation related to the income of the trust. The Circular, though, does not establish who should act as the donation's beneficiary.

During the life of the trust and upon its termination, all the donations will be subject to income tax for the beneficiaries. It is interesting to note a fundamental difference here: with the revocable trust, the final transfer to the beneficiary is subject to gift tax where, in case of a foreign resident settlor, due to the lack of wealth to levy a gift tax, the total sum received is subject to income tax (Art. 16(I) of the Federal Direct Tax Law, 7(I) Law on the harmonization of direct taxation of cantons and municipalities, LAID), unless the beneficiary is able to prove that the said donation does not constitute, entirely or in part, income. In this option, the initial rule applies, whereby the donation is the only fiscal event in the establishment of the trust, regardless of the fact that it may be virtual. Consequently, if the wealth has already been taxed as a donation (although virtual) no further taxes will be levied except the ordinary wealth tax on the beneficiary from the distribution onwards.

At this stage it is important to mention that the tax principle applied to trust donations states that the income tax prevails over the wealth tax.

Taxability and immigration

This issue is directly linked to the establishment of trusts by a settlor that is domiciled outside Switzerland when attributing the wealth.

For clarity purposes, we need to start by saying that in this case "immigration", as said above for the concept of domicile, is to be seen from a fiscal perspective, thus meaning the transfer of the settlor's taxability.

We will now refer both to Swiss citizens that are domiciled abroad and, more importantly, to foreign citizens that move to Switzerland.

As already mentioned, the trust is characterised by its immediate establishment and by the permanent domicile of its "main actors". The question is, therefore, what consequences are there on the taxation of the trust when one of the parties decides to change his/her domicile, i.e. moving to Switzerland?

The STA Circular clearly defines the situation of subjects that are domiciled in Switzerland and, in the case of the irrevocable discretionary trust, also the one of settlors who are domiciled abroad. To sum up:

- Domiciled settlor of revocable trust: the settlor will remain taxable as no distribution is recognised. Upon termination, the gift tax will be levied.

- Non-domiciled settlor of revocable trust: the domicile of the settlor has no relevance in this case since no transfer of wealth is recognised. The settlor will continue to have the same fiscal profile and the distributions will be subject to gift tax for the beneficiaries domiciled in Switzerland. Upon termination, the Swiss domiciled beneficiaries will be subject to gift tax.
- Domiciled settlor of irrevocable fixed-interest trust: the transfer of assets is recognised and the beneficiaries will be taxed on the portion of assets to which they are entitled.
- Non-domiciled settlor of irrevocable fixed-interest trust: the transfer of assets is recognised and the beneficiaries will be taxed on the portion of assets to which they are entitled.
- Domiciled settlor of irrevocable discretionary trust: the settlor will remain taxable as no distribution is recognised. Upon termination, the gift tax will be levied.
- Non-domiciled settlor of irrevocable discretionary trust: the transfer is recognised with consequent application of the gift tax if provided by the relevant legislation; in addition, the beneficiaries will be subject to taxation upon distribution of the assets. Upon termination, the income tax will be levied.

From a fiscal perspective, a foreign citizen is entitled to move to Switzerland either as an ordinary taxpayer (this also applies to a Swiss citizen who has been living abroad) or as a “global” taxpayer (this option is only available in Switzerland; in this case, the immigrant will be considered Swiss only for one year and under certain conditions), whereby the taxes will be levied on the “living expenses” rather than on the actual income and wealth. We will now go in to further detail on these two cases. When dealing with immigration and taxability the main subjects to be taken into account are the settlor and the beneficiary. As mentioned below, in many cases immigration is relevant for trust taxation purposes only for one of them.

First of all, we must note a crucial difference between these two actors: on the one hand, the role of the settlor is important during the establishment of the trust, that is to say when he or she has a direct relation with the trust itself and the trustee. After this stage, his/her role comes to an end. This obviously applies only to private law: as mentioned above, from a fiscal point of view things may differ.

On the other hand, the beneficiary begins with being only a passive (sometimes even unaware) subject, to later acquire importance as the life of the trust progresses; he/she receives donations, information, and establishes an interaction with the trustee. This goes on until the termination of the trust, when the beneficiary receives

all the trust funds and the trust ceases to exist. In this case, too, things may be different from a fiscal perspective.

The ordinary taxpayer

The ordinary taxpayer is typically embodied by someone who owns a professional, entrepreneurial business or a cottage industry and lives on his/her own income. The taxpayer who lives on the income of his/her own assets, but does not have the “global” fiscal status, is also considered an ordinary taxpayer.

- Settlor of a revocable trust: in this case, no transfer of assets is recognised. The settlor is domiciled in another country, where he/she is subject to taxation. Whenever he/she moves back to Switzerland and becomes a potential taxpayer, it is evident that the assets should be taxed, although the STA still does not recognise them as transferred. In this case, there is also the question of combining the different fiscal provisions in force in all the relevant countries. For instance, if the settlor has already paid the gift tax in the previous country of residence, (as would be the case of Italy, for example), levying an income tax in Switzerland would definitely clash with the other country's fiscal rules. If the beneficiary is domiciled in Switzerland, the income tax would have been levied on the donations and this would have been consistent with the other tax system; the inconsistency begins, though, after the settlor has paid the gift tax and the beneficiary has paid the income tax, when the settlor moves to Switzerland and has to pay the wealth tax on the trust (and the gift tax on its termination). In this case, would the Swiss system comply with the rules of the previous country, thus removing both taxes? If so, who should be taxed on the wealth of that trust? In theory, the beneficiary. It is still unclear, though, who should be charged for the income tax: the beneficiary (as logic suggests) or the settlor? Referring to the categories set by STA, a possible solution would be the one of the fixed-interest trust: the wealth is attributed to the beneficiary, who pays the income tax on it. In this case, though, would this wealth be taxed retroactively? Finally, if the beneficiary is domiciled abroad, it is likely that the Tax Authority would simply accept the tax provisions adopted in the foreign country without attributing the wealth to the settlor. Due to the immediate legal relationship between the settlor and the trust, it would be most appropriate for the Swiss tax authorities to simply accept the provisions adopted abroad and act consequently. What stated so far, though, would only be valid for a trust that is totally irrevocable, at least from a private law perspective.
- Beneficiary of a revocable trust: whether the beneficiary is in Switzerland or not has no fiscal relevance since he/she is not taxable for the trust according to the Circular, both if the settlor is domiciled in Switzerland or abroad. In

case of donations, the gift tax would apply. This would also be valid if the settlor's foreign country of domicile established a fiscal duty on the income of the beneficiary.

- Settlor of an irrevocable fixed-interest trust. In this case, the assets are considered transferred with the establishment of the trust. When moving back to Switzerland, thus, the settlor appears to have no assets, regardless of having paid taxes abroad. The beneficiary's domicile is not relevant and he/she will be subject to the applicable taxes (the wealth and income tax on the trust in Switzerland; the relevant taxes in the foreign country).
- Beneficiary of an irrevocable fixed-interest trust. Upon immigration, wealth and income tax on the trust should be levied on the beneficiary of this trust (although not retroactively).
- Settlor of irrevocable discretionary trust: as seen above, this is the most complex case of the STA system. This type of trust is a sort of "hybrid", as the donation does not refer to a taxable subject due to lack of taxable wealth. The Swiss domiciled beneficiary is subject to income tax even on final distribution of wealth. Once in Switzerland, the wealth is not subject to the gift tax. As in the case of the fixed interest trust, there is an immediate transfer of wealth and a tax is levied, if applicable, based on where and when the trust is established. In this sense, the revocable trust, in most cases according to the STA, gives rise to various questions because, unlike the two other types of trust, it does not imply a direct transaction. It is also true that the beneficiary of this particular trust, if Swiss domiciled, is subject to income tax, but not to wealth tax, at least until the settlor moves back to the country. At this stage, then, it would be plausible to levy both the wealth and the income tax on the beneficiary and the final distribution would be exempt from the wealth tax, provided that the beneficiary is able to prove that the wealth was part of the original donation. In case the beneficiary is domiciled abroad, there seems to be no relevant fiscal profile for the settlor. However, we could argue that the same trust, established by a Swiss domiciled settlor, does not imply a transfer of wealth and, upon immigration, the Tax authority could still assign the wealth to the beneficiary with all the consequences mentioned above in relation to the revocable trust: wealth and income tax levied on the settlor and gift tax upon each donation (although not applicable if already charged in the foreign country).
- Beneficiary of irrevocable discretionary trust: the immigration of this beneficiary is not relevant in case the settlor is domiciled in Switzerland when distributing the assets. The beneficiary has in fact no fiscal profile, except any potential gift tax applicable to the donation. The situation would be different, though, in case the trust was established abroad: here, the

beneficiary would be subject to income tax on the basis of his/her actual income.

The Circular, though, does not mention trusts where distributions take place in different stages, both before and after immigration to Switzerland of any of the parties. In our opinion, however, this matter would deserve special attention because the nature of the trust itself and of its settlors make it possible for distributions to occur at different times and under various circumstances. When the distributions take place before and after immigration of the settlor or the beneficiary, what would be the most suitable tax provisions? A possible solution would be that of considering each distribution as a separate trust, at least from the fiscal point of view; however, in this way we would run the risk of creating several fiscal profiles for the same wealth with the same settlor and goal. Another solution would be that sticking to the initial distribution; but this would lead to potential abuses that we want to avoid.

At the same time, the trust has often several beneficiaries, who are often domiciled in different jurisdictions. In this case, the solution appears obvious: each beneficiary will have the fiscal profile relevant to their country of residence and its norms. However, this option may also cause some confusion.

The “global” taxpayer

Switzerland is well known by wealthy citizens of many countries because it offers foreigners the possibility of paying wealth and income tax on the basis of their living expenses rather than their actual income. This method, called “lump sum taxation”, is totally legal and it works particularly well on individuals whose properties are very varied and distributed among different places and are therefore difficult to quantify and assess. The lump sum taxation does not necessarily result in a fiscal advantage for the taxpayer, as it all depends on the situation of their wealth and income.

This article will not examine the rule on lump sum taxation as defined by Art. 14 of the Federal Direct Tax Law and later by STA Circular no. 9 of 3 December 1993; we will merely mention the basic principles adopted by the Tax Authority to define this method.

The main point is that this tax is not based on wealth or income, but on the actual expenses. On these premises, the trust, being part of wealth and income of the individual, should be completely transparent to the fiscal system. However, this is not always the case.

The lump sum tax is calculated on the basis of the living expenses that are nevertheless difficult to determine. Although the Circular offers a detailed list of expenses to be considered for the assessment, the main reference should be the housing expenses: according to this method, living expenses are deemed equal to five times the annual rent of the apartment where the taxpayer is living or, if the house is owned, five times the annual rental value, with a minimum of CHF 175,000 (updated on an annual basis).

However, the expenses could still be higher than the sum calculated with this method because they are also subject to the so-called “control calculation” as defined by Art. 14 of the Federal Direct Tax Law, regulated by the aforementioned Circular, and confirmed, in the specific case of the so called “modified global taxation”, by the Federal Court, stating that “the taxation is also based on the foreign incomes of the taxpayers as they could influence their expenditure”.

When operating the control calculation, the Swiss Tax Authority needs to consider numerous sources of income, but they must all be originated in Switzerland. For the purposes of this article, we simply need to note that this calculation (and consequently the tax) depends on the income and wealth of the individual. The results of the housing expenses method and of the control calculation are then compared and the one resulting in the higher assessment and the highest tax payable will apply.

It can be said, then, that the trust has an impact on the “global” taxpayer and in some cases it could even have a determinant effect. In any case, depending on the STA dispositions on trusts, it is clear that in some issues the legal despoliation of assets does not imply a fiscal transfer, thus making the settlor taxable on their basis. In some other issues, though, despite his/her “passive” status, the wealth arising from the trust may be attributed to the beneficiary, who may be therefore subject to a wealth tax, besides the usual income tax.

The Swiss Tax Authority does not deal with this matter neither in their Circular on trusts or in the previous one on lump sum taxation; in doing so, it leaves room for alternative views, such as:

- Settlor of a revocable trust: in this case, the wealth is considered as not transferred. It would therefore be plausible that the income generated by the trust from a Swiss source is subject to the control calculation. With due exceptions, the aforementioned considerations on the ordinary immigrant apply. It is unlikely that assets that have been legitimately transferred and subject to gift tax while the settlor was abroad may still be subject to control calculation as if they were still in the hands of the settlor when he/she actually does not obtain any economic benefit from them. The purpose of the control is in fact to investigate the actual situation of the “global” taxpayer and not to simply calculate the virtual potentials. This method

would also be consistent to the one applied earlier to the case of the ordinary taxpayer in relation to the irrevocable fixed-interest trust. As said above, this solution would cease to apply in the case the trust is revocable, even if only for private law.

- Beneficiary of a revocable trust: this case, too, may lead to conflicting and incompatible scenarios. If on the one hand the immigration of the beneficiary of this trust is not relevant for the above stated reasons, on the other hand it is also true, even without legal certainty, that the beneficiary has access to an income that may influence his/her expenditure.
- Settlor of an irrevocable fixed-interest trust: In this case, the assets are transferred upon establishment of the trust and are therefore not relevant for the global taxation.
- Beneficiary of an irrevocable fixed-interest trust: this case is also quite straightforward as the assets and income related to the trust have a role on the living expenses and are thus included in the control calculation. If, according to private law, the beneficiary cannot access the assets of the trust until its termination, he or she still benefits from the income and his or her expenses are also based on it.
- Settlor of irrevocable discretionary trust: this is the case of the “virtual” donation without a taxable recipient or taxable wealth. The settlor does no longer control or benefit from that wealth and is therefore not taxable either.
- Beneficiary of irrevocable discretionary trust: the interpretation on this case is purely based on facts. In a discretionary trust, the beneficiary is established (or becomes aware of it) upon delivery of the donation. This income, if coming from a Swiss source, should be taken into account for the control calculation.

Conclusions

The issue we are dealing with is very broad, and always regulated by both federal and cantonal authorities. In addition, it is also very new and thus subject to endless variations and interpretations.

The Swiss Tax Authority has so far made an excellent structuring effort that will certainly not remain isolated: thanks to the active contribution of the researchers and professionals of the sector, there is space for further investigation and definition.

The decision of not recognising the trust in the tax law avoids many of the questions arising in those jurisdictions that see it as a fiscal entity; nevertheless, it does give rise to other problems that have already been solved elsewhere. Practice will suggest

us the most appropriate solution; the advantage of the Swiss method, though, is its consistency with the overall fiscal system.

The experience gained while working on this article allows us to say that the solutions offered by the Circular for domestic cases, even when not totally agreed with, appear functional and effective.

From a practical point of view, we can list three essential elements that appear crucial for a successful solution, regardless of future evolutions.

The subject belongs to the jurisdiction of the cantonal authorities, and each of them adopts a different view of the facts and of the possible fiscal profiles (think, for example, of the lump sum tax or the gift tax rates).

In the cantonal Tax Offices, the staff is fully qualified and happy to discuss the concrete aspects of each case with the operators in order to find a constructive solution.

In Switzerland, the fiscal principle of “substance over form” does not only benefit the Tax Authorities, but also the taxpayer (as it happens for instance in the case of the “global” taxpayer mentioned above).

Our research showed that the most complex issues are the ones arising in relation to the interaction between Switzerland and the “outside world”. The objective of this article was mainly to deal with this interaction and with the more general issue of the so called “global village” as related to the taxability of the trust, a tool that is now object of a renewed interest for its ability to follow the individual anywhere and at all times, even after death. Our purpose was therefore to deal with this subject in order to define its shape, characteristics and nuances and provide inspiration for further analysis and new solutions