

opción

Revista de Antropología, Ciencias de la Comunicación y de la Información, Filosofía,
Lingüística y Semiótica, Problemas del Desarrollo, la Ciencia y la Tecnología

Año 35, 2006, Especial V

20

Revista de Ciencias Humanas y Sociales

ISSN 0013-0227 ISSN+ 2477-0388

Depósito Legal: pp 14690321006



Universidad del Valle
Facultad Experimental de Ciencias
Departamento de Ciencias Humanas
Barranquilla - Colombia

The risks associated with the logistics chain of scientific research from the choice of research area to the analysis of obtained results

**T.M. Litvinova
I.U. Glazkova
L.Sh. Kazieva
A.C. Kurinnaya
V.A. Dezhurko-Korol**

Sechenov First Moscow State Medical University, 8/2 Trubetskaya St., Moscow, 119991, Russian Federation

Abstrac

This article looks at the most common risks associated with the logistics chain of scientific research aiming to visualize, optimize and simplify the process of conducting scientific activity. With the help of systematic research methodology and information analysis, the authors have developed and suggested a logistics chain of scientific research with due account for risks that can arise at different stages of scientific research. The process of acquiring knowledge presented as a logistics chain of scientific research with consideration of risks is a set of certain actions aimed at achieving the set goals and getting reliable results.

Keywords: scientific research, researchers, risks, logistics chain of scientific research, risks within the logistics chain.

Los riesgos asociados con la cadena logística de la investigación científica, desde la elección del área de investigación hasta el análisis de los resultados obtenidos.

Resumen

Este artículo analiza los riesgos más comunes asociados con la cadena logística de la investigación científica con el objetivo de visualizar, optimizar y simplificar el proceso de realización de la actividad científica. Con la ayuda de una metodología de investigación sistemática y análisis de información, los autores han desarrollado y sugerido una cadena logística de investigación científica con la debida cuenta de los riesgos que pueden surgir en las diferentes etapas de la investigación científica. El proceso de adquisición de conocimiento presentado como una cadena logística de investigación científica con consideración de riesgos es un conjunto de ciertas acciones destinadas a lograr los objetivos establecidos y obtener resultados confiables.

Palabras clave: investigación científica, investigadores, riesgos, cadena logística de investigación científica, riesgos dentro de la cadena logística.

1. Introduction

The work of researchers consists in conducting scientific research, the purpose of which is to confirm or refute the suggested hypotheses and to achieve a certain result. However, very often researchers find themselves in circumstances when the resources, especially the time frames, are limited. Therefore, it is important to organize the correct sequence of events and predict the main risks that can stand in the way of achieving the desired result of scientific activity (Volkhova, 2016; Litvinova et al., 2017).

The aim of this research is to develop a logistics chain of scientific research in order to visualize, optimize and simplify the process of conducting scientific activity with due account for the main potential risks.

In the context of scientific activity, a logistics chain is defined as a linearly ordered set of stages within the logistics process that constitutes an adaptive closed-loop system carrying out particular operations and functions.

Any logistics chain always contains risks, since in real life execution of a task never happens according to the best-case scenario; there is always a probability that something will go wrong. It is impossible to predict all potential risks but trying to foresee the most likely problems that can arise at different stages of execution of a task and developing scenarios of how these problems can be solved are integral parts of creating an effective logistics chain (Sergeev, 2017; Smyslova et al., 2017).

Risks can be encountered at all stages of the logistics chain of scientific

research. Thus, understanding the types of such risks and ways of their minimization is necessary for more effective planning and conducting scientific research. Let us consider the possible risks that can arise at different stages of the logistics chain of scientific research.

2. Methods

Based on systematic research methodology and information analysis, we have developed and suggested a logistics chain of scientific research with due account for potential risks. In order to identify risks, the 5 Whys technique and the Pareto principle were used.

3. Results and discussion

According to literary sources, scientific research is defined as a process of studying, experimenting, conceptualization and verification of theories connected with obtaining scientific knowledge (Nikitin, 2017).

Conducting any scientific research starts with the choice of the research area, which is defined as a scope of scientific activities conducted by a research group and devoted to the execution of theoretical and experimental tasks in a certain branch of knowledge.

At the stage of choice of research area, the following risks may arise:

- the chosen research area is not developed in the research organization/university;
- the research area of interest is new, therefore, there is little scientific literature devoted to it and/or there are no resources for running experiments;
- the research area is irrelevant, and scientific work in this direction will not have an innovative component;
- this research area is fundamental, so it is impossible to conduct short-term research and get results quickly.

In order to avoid these risks, one should choose a wider research area or a combination of several areas. Then, having studied the current situation in these spheres and the resources of the corresponding research organization/university and other potential scientific institutions, one can choose the most preferable research area.

When the choice of the research area is made, it is necessary to choose the topic of scientific research, i.e. a scientific task encompassing a certain field of scientific research. The topic of scientific research should meet a few requirements: relevance, scientific novelty, economical efficiency and practical significance. Besides, one should determine the subject of research (what is going to be

studied and explored) and its scope (various aspects of the subject, its attributes and specific features that are going to be studied in the course of research) as the main focus of the research. Choice of the topic should be preceded by a thorough review of local and foreign literary sources in the corresponding and related sciences. Choice of the research area can be made within an established time frame or throughout a long period of time. Specialized scientific journals, both foreign and local, online databases, etc. can be used as sources of information.

The following risks may arise at the stage of choice of topic of future scientific research:

- the topic is outdated or well-researched;
- there is a lack of materials about the chosen topic in open sources of information;
- the topic is not on the list of research areas explored by the research organization/university;
- the chosen topic requires experimental procedures that are too difficult or technically impossible to conduct at the present moment;
- there is no experimental base for conducting scientific research;
- the chosen topic is too similar to the topic assigned to another researcher or coincides with it.

In order to avoid the above-mentioned risks, one should choose several topics in the research area of interest. Next, one should discuss the potential topic of scientific research together with the academic advisor relying on the results of the conducted information review and literary search, relevance and accomplishability of such research.

After choosing a relevant topic of scientific research, it is necessary to study the literature in the corresponding field more thoroughly to formulate the objective of future research. The following risks may arise at this stage:

- the research objective may have low scientific value;
- the research objective may be technically difficult to accomplish;
- the research objective may require information that is impossible to access (a commercial secret, etc.).

In order to avoid these risks, it is necessary to consider the benefits and drawbacks of the potential research objective and determine which scientific issue is addressed by this research.

The next stage is planning of scientific research and searching for a scientific experimental base for conducting the experimental and practical part of the research. The following risks may arise at this stage:

- there is no available base for execution of the experimental part of the research;
- the experimental part of the research requires use of expensive equipment

which junior researchers have no access to;

- the base for conducting the planned experiments exists, but it cannot host junior researchers due to the fact that laboratories are overbooked;
- the experiment requires the purchase of expensive chemical agents and/or standard samples, for which no financial resources have been allocated;
- in the course of planning of the experimental part, the researcher has not considered the possibility of carrying out another set of analyses or usage of confirming analyses requiring other equipment.

In order to avoid the above-mentioned risks, one should start searching for the base for execution of the experimental part of scientific research as early as possible, as soon as the research objective is formulated. It is also important to consider the possibility of additional experiments and think about the necessary resources for conducting the research.

After the determination of the scientific experimental base for conducting the experimental research and finding the necessary resources, the researcher moves on to execution of the experimental part of the scientific research. The main purpose of this process is receiving reliable results in certain reproducible conditions. In the course of the experiment, the researcher observes the subject of research and conducts exact measurements of its characteristics, thus gathering statistical data. The following risks may arise at this stage:

- lack of necessary chemical agents and/or standard samples as a result of different circumstances, in particular, due to improper transportation and/or storage.
- possible failures of equipment that has no analogues in other available scientific experimental bases;
- the academic advisor cannot perform their duties for various reasons (resignation, illnesses, etc.);
- the methodology used in the experiment does not deliver reproducible results.

In order to avoid these risks, one should study the existing experience of working with such methodology/equipment/chemical agents and get familiar with their specific features. It is important to think through the possibility of using equipment in other scientific experimental bases in case the equipment in the laboratory where the research is conducted is faulty. In addition, it is a good idea to ask the workers of the scientific experimental base which services are used to order chemical agents/standard samples necessary for the analysis.

After conducting the experiment, the researcher starts to process data obtained in the course of the practical part of scientific research. In order to assess how acceptable the results are, the researcher analyzes and interprets the data obtained

during the experiment with the help of appropriate statistical and other methods. This stage can be associated with the following risks:

- the results contradict the initial hypothesis;
- the results inferred from the obtained data inhibit their interpretation;
- the data are not representative enough;
- in the course of the research, some results have been found that are difficult to explain.

Avoiding risks from this group is the most difficult part of all since they can be identified only after completion of the experimental part of the scientific research. However, it is possible to reduce such risks by conducting preliminary research, which allows determining the appropriateness of the methodology and quality of the obtained data.

To sum up, we have developed a logistics chain of scientific research with due account for the most common risks (Figure 1).

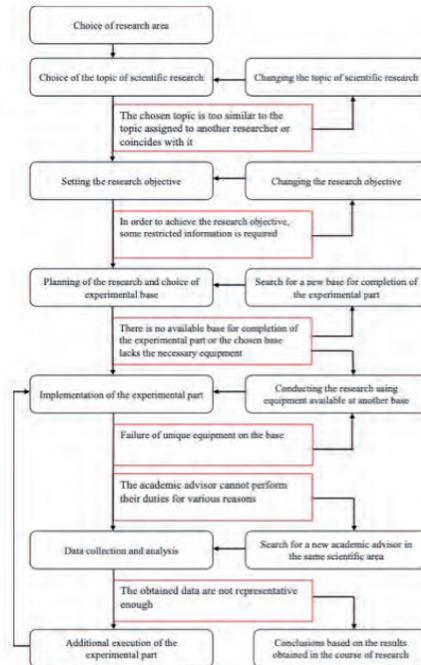


Figure 1. Logistics chain of scientific research with consideration of the most common risks

4. Conclusion

To conclude, the process of acquiring knowledge presented as a logistics chain of scientific research with consideration of risks that may arise at different stages of scientific activity is a set of certain actions aimed at achieving the set goals and getting reliable results.

Acknowledgments

The publication has been prepared with the support of the Russian Academic Excellence Project 5-100 (Sechenov First Moscow State Medical University Program 5-100).

References

- Litvinova, T.M., Glazkova, I.U., Kolomiets, O.M., Smyslova, O.A., and Denisova, M.N. (2017). Using case method in organizing student academic/professional activity as part of the educational process. *Espacios*, 38(56), 29-36.
- Nikitin, S.I. (2017). Analiz i klassifikatsiya nauchnykh issledovaniy v psikhologii [Analysis and classification of scientific research in psychology]. *Alleya nauki*, 1(16), 825-843.
- Sergeev, V.I. (2017). *Upravlenie tsepyami postavok* [Managing supply chains]. Moscow: Urait Publishing.
- Smyslova, O.A., Litvinova T.M., Glazkova I.U., Denisova M.N., Ermakov D.A., and Suvorova I.I. (2017). Pharmacotherapeutic efficiency of the new complex urological herbal medicine in experimental urolithiasis. *International Journal of Green Pharmacy*, 11(4), 101-108.
- Volokhova, E.S. (2016). Osnovnye etapy nauchnogo issledovaniya [Main stages of scientific research]. *Molodoi uchenyi*, 6, 755-757.



**UNIVERSIDAD
DEL ZULIA**

opción

Revista de Ciencias Humanas y Sociales

Año 35, N° 20, (2019)

Esta revista fue editada en formato digital por el personal de la Oficina de Publicaciones Científicas de la Facultad Experimental de Ciencias, Universidad del Zulia.

Maracaibo - Venezuela

www.luz.edu.ve

www.serbi.luz.edu.ve

produccioncientifica.luz.edu.ve