# The Role of Transition of Workforce between Companies in Transferring Technology

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## ABSTRACT

The transition of professionals between different sectors is considered as one of sources of acquisition of technology and will lead to add the practical experience to them. This experience depending on different factors like: the scientific degree and practical experience by the professionals, the technology possessed by the transferor sector, the duration that spent by experienced in transferor sector, the type of work performed by professional….etc.
The research aims to verify the affect of these factors in technology transfer process.
Research reached that the technology transfer process which is depending on the Iraqi competencies in work is unsatisfied level between Iraqi organizations because there are different obstacles behind this. Research diagnosed such obstacles as well as the procedures that followed-up by professionals to serve this process.
**Key words:** technology transfer, foreign company, public sector, private sector.

## دور انتقال القوى العاملة بين الشركات في نقل التقنية

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### الخلاصة

يعد انتقال المهنيين بين مختلف القطاعات كأحد مصادر الحصول على التقنية ويؤدي إلى إضافة الخبرة العملية لهم. هذه الخبرة تعتمد على عوامل مختلفة مثل: الدرجة العلمية والخبرة العملية من قبل المهنيين، والتقنية التي يمتلكها القطاع الناقل، والمدة التي يقضيها ذوي الخبرة في القطاع الناقل، ونوع العمل المنجز من قبلهم ... الخ

يهدف البحث للتحقق من تأثير هذه العوامل في عملية نقل التقنية. لقد توصل البحث إلى أن عملية نقل التقنية المعتمدة على الكفاءات العراقية في العمل بمستوى غير مرضٍ بين المنظمات العراقية لأن هناك عقبات مختلفة وراء ذلك. شخص البحث هذه العقبات، فضلا عن الإجراءات التي قام بإتباعها المهنيين التي تخدم عملية نقل التقنية.

- **الكلمات الرئيسة :** نقل التقنية ، الشركة الأجنبية, القطاع العام, القطاع الخاص.

## 1. INTRODUCTION

The scientific and technical communication became today a justified subject, so Iraqi companies have to work on investigating and exploring the continued progress of this important industry in economics.

Workforces have role in technology transfer and could be achieved into two main factors by training the workforces either in the workplace or outside it, as well as encouraging the movement of professionals between different sectors, and this improves the exchange of experiences between workforces that need it. This paper focuses on the second factor in transition of professionals.

## 2. DEFINITION OF TECHNOLOGY TRANSFER

Analyzing technology transfer is difficult, in part because of numerous conceptual and measurement problems in defining technology, understanding the many concurrent processes in its transfer, and conceptualizing and measuring the impacts of technology transfer, **Rubenstein and Heisey,2005**.

Before understanding the term of (Technology Transfer), it is necessary to identify separately each of Technology and Technology Transfer.

### 2.1 Definition of Technology

Technology is defined as: 1. the science or study of the practical industrial arts; 2. the terms used in a science, technical terminology; 3. applied science, **Bozeman,2000.**

Technology "can be broadly defined as the process of acquisition, adaptation, integration and use of technological knowledge by a nation other than the one that develops the technology and has different political, economic, social, and cultural contexts, **Salem,2011.**

Technology is indeed an interdisciplinary area covering the broader (comprehensive) conceptual framework of scientific, managerial and engineering aspects of knowledge. Therefore, technology can be defined as a study of how humans use the environment to meet their needs, **Tesfayohannes and Temtime, 2002.**

### 2.2 Definition of Technology Transfer

Technology transfer can be defined in different approaches based on adaptability and utilization for specific purposes.

Technology transfer should be seen in terms of achieving three main objectives: first, introduction of a new technology by investing in new products, improvement of existing techniques and generation of a new knowledge **Vutsova and Ignatova,2013**.

Through technology transfer, ideas and skills could be shared between countries, thus increasing the stock of ideas in the receiving country and reducing the idea gap, **Murshid,2014.**

Or the concept of technology transfer is defined as the process through which technological know-how is adopted by the user through practices that improves and enhances the performance or delivery requirements of an enterprise or an individual, **Ashekele and Matengu, 2008.**

## 3. METHODS OF TECHNOLOGY TRANSFER

Below are three approaches for selecting a knowledge transfer method.

☒ Select a knowledge transfer method by user needs - can be used when an individual, team, or organization has specific needs in mind.

☒ Select a knowledge transfer method by context and types of knowledge—can be used when an individual, team, or organization has a specific type of knowledge to be transferred.
☒ Select a knowledge transfer method by level of experience - can be used when the potential receiver of the knowledge has a specific level of experience, **Piktialis and Greenes ,2008.**
☒

### 3.1 Element of Technology Transfer

Three elements of technology transfer: hardware, know-how and know-why, **Memo,2000.**
The three types of flows identified in the above definition are in the literature on technology transfer usually termed:
(1) **Hardware:** equipment, machinery, capital goods, product design etc.
(2) **Know-how:** Competence and skills to absorb and adapt techniques to local circumstances, to fulfill intended tasks.
(3) **Know-why**: Ability to generate and manage technological change.

### 3.2 Role of Human in Technology Transfer

The empirical studies show "that more highly-educated individuals tend to adopt innovations earlier and implement and adapt them sooner than less-educated individuals". This applies both to the consumption of new technologies. More educated and skilled workers are argued to have greater 'functional flexibility' in that their greater stock of knowledge increases the rate at which they learn and develop higher order problem solving skills, **Toner,2011**.
Technology and knowledge may also be transferred through the movement of people –employees, **Wahab et al.,2012.**
Human capital is an essential element of the technology transfer process, **IFPMA, 2011.** The successful absorption of technology or know-how in the recipient country and its translation into greater economic development hinges on the availability in the host country of an educated workforce with, for example, engineering and management skills.
People are the key to successful technology transfer, **Willis and Ashworth,2002:** as people and not papers transfer technology. This implies that the people in the transfer process have to be:
➢ informed about the process
➢ consulted about their needs, concerns, perceptions, attitudes and expectations
➢ trained/mentored to understand and utilize the technology to its fullest extent.

#### 3.2.1 How skill and knowledge are being transferred

The collaborations with foreign firms had a positive impact on the efficiency and productivity of employees, **Murshid,2014.** There are different ways for achieving knowledge for instance:
- Labor turnovers: Labor turnover occurs when workers trained by foreign firms or managers transfer their knowledge to other firms when switching employers.
- Labor spin-offs: Labor spin-offs happen when an employee of a foreign firm starts up a new firm based on the know-how gained from previous experience, **Murshid,2014.**

### 3.2.2 How to improve the employees' skills

The benefits of training and education not only accrue to the individuals receiving the training, but also to the firms that employ the workers and the economies in which the workers are employed, **Rounds,2013**.

❖ Firms that implement employee training programs increase their labor productivity and can eliminate productivity gaps with competitors.

❖ Countries that provide quality education and job-training programs that improve the skills of their workforce tend to have more economic growth and higher levels of economic development than those that do not.

Developing countries, **Ogunade,2011** have over time, adopted myriad strategies to train and develop their workforces to meet global economic challenges and rise out of the cycles of low skills and poverty.

Over the last decade, companies have changed how they tap into the extended workforce. Initially, they did so as a tactical response to an immediate need. But then they began making this workforce a key component of corporate strategy. This shift has enabled organizations to achieve two of the most sought-after competitive capabilities: agility in the face of a highly turbulent business environment and access to high-performing, highly skilled talent, **Silverstone et al., 2015.**

The outcomes of employee's ability and motivation, **Omar et al., 2011** would influence the measurement on the absorptive capacity of TT in the form of knowledge, skills and tools into organizations via construction projects. Knowledge, skills and tools could be transferred and shared among employees and extensive intra organizational communication is likely to contribute to employees' motivation.

## 4. TACIT AND EXPLICIT KNOWLEDGE

As mentioned in technology transfer definition previously for transferring the ideas, skills and information, so there is a connection and a strong relationship between the technology and achieved knowledge. It is necessary to distinguish the types of acquired technology depending on kinds of knowledge; there are two major types of technologies: Tacit Knowledge and Explicit Knowledge

Tacit Knowledge: in a practical direction, segmenting it into two dimensions, technical and cognitive. Technical dimensions encompass craft and skills captured in concrete 'know-how' exemplified by the master craftsman who is often unable to articulate what he or she knows. 'Knowhow' cannot always be codified since it often has important tacit dimensions, **Kakabadse et al., 2001.**

Tacit knowledge refers to the undocumented and unarticulated (but nevertheless important) knowledge held by practitioners. It is also known as "inarticulate intelligence," "collective wisdom," or "elusive knowledge." The phrase "tacit knowledge" an influential of epistemology, but in recent years it has been used by management theorists as a key piece in the process of knowledge management. Tacit knowledge is contrasted with explicit knowledge, which is expressed knowledge that is communicated to others. When explicit knowledge is documented, it becomes "codified."

Codified knowledge is usually quite structured and appears in written reports, databases, and other media, **Stover-2004.**

On another word the major difference between them defines as follows, **Smith-2001**: Tacit knowledge is technical or cognitive and is made up of mental models, values, beliefs, perceptions, insights and assumptions. Technical tacit knowledge is demonstrated when people master a specific body of knowledge or use skills like those gradually developed by master craftsmen.

Most explicit knowledge is technical or academic data or information that is described in formal language, like manuals, mathematical expressions, copyright and patents. This ''knows-what,'' or systematic knowledge is readily communicated and shared through print, electronic methods and other formal means.

## 5. DATA COLLECTION

According to hypothesis of this paper of the important role of the human capital for transferring technology, so this paper has guessed the greatest role will be done by human capital in this process.

The questionnaire was prepared for different purposes including the role of human capital in case of professionals' transition between different sectors and the importance level of this transition for transferring technology.

**5.1 Size and Nature of Specimen:** The specimen has different jobs, specializations, scientific degrees, practical experiences as well as they are working in different sectors either public or private sectors. **Table 1** describes these characteristics. This variety in this specimen will provide a good chance for verifying their responses in this matter as follows:

1- The scientific degree possessed by respondent has the greatest level for enable to evaluating the types and importance of technology or for the best utilizing it.

2- The practical experiences possessed by respondent; this experience can evaluate the advanced technology for executing the project.

3- The Nature of job occupied by respondent, this reflect the complexity of technology needed and seeking for utilizing the adequate technology.

4- The ready to accept or to be familiar with on technology and willing to transfer it to other

**Table 1** shows the different of specializations for respondents as well as the different occupied sectors either public or private.

In additional to classification mentioned above, research has used the other categories depending on Engineering Ranks and Functional Ranks: their practical experiences or the practical title regarding to numbers of years in their job. In other hand the other category is used according on the classification of Iraqi Engineers Union, this classification was used for two reasons the first; it should be depended on years of achieved the specialty, second; the research assumes this party has to take its role for improving the professionals technical skills and knowledge. **Fig. 1** describes the last two classifications. The functional description has (7) seven degrees: An expert, Senior of Chief of Engineers, Chief of Engineers, Assistant Chief of Engineers, Senior Engineer, Engineer and Assistant Engineer.

**5.2 Transition of Professionals: Fig.2** shows the transition (movement) of professionals from public to private sector or vice versa or such movement did not happen. the ways to get the technology either by importing technology, and then developing the imported technology, or through accessing technology and self-development by relying on existing technical experts and scientific talent who have long experience. The process of technology transfer happens during a transition or exchanging between institutions, by equipments and plants, or the exchanging in skills and knowledge between the professionals.

The Human Resources Management in each ministry or in their organizations (establishments) has to study this transition in consideration to achieve the technology skills.

However, there is 50% proportion of transition of professionals that have no changed their sectors; this rate refers to respondents who still in their job in both public and private, but they got the foreign skill from contracts which signed between their organizations and foreign companies previously or recently.

This gives a rate of a transition case of employees for this specimen in leaving the public sector and settling down at private sector or vice versa.

**5.3 Agreement in Variance of the Level of Technology:** This section of questionnaire asked respondents for their opinion about differences between the sectors in technology. Technology includes and will always refer to the Mechanization, Scientific and administration in this research. The answers ranging from '1 = strongly disagree' to '5 = strongly agree'. **Fig.3** displays those answers, and will lead to verifying the reasons for the difference in technology between sectors and how to raise the level of the sector and access to technology of (mechanization, scientific and administration).

**Fig. 3**`displays the mode of these readings turns to (Strongly Agree) with readings 31 by range 5, and it is the upper among them.

The statistical calculations (Mean and Standard Division) explain in **Table 2,** the table shows these statistics descriptive.

**5.4 What Sector is Technically Better than Other?:** Research provided 4 (four) choices; **Fig. 4** shows those opinions as percentage. Analysis will be discussed.

Research performed the statistic analysis between this Answers group and the answers group of (Transition of Professionals between Public and Private Sectors) as displaying in **Table 3.**

The result refers to the low forward correlation, between the Private and Public Sectors (raw 1 and raw 3), but in the same time the correlation value refers to high forward correlation between the Private and Public Sectors which have the contracts with foreign companies; it means to support them to contracting with foreign companies.

Discussing these answers is as follows:

***i.*** The private sector is seeking for profitability before everything else, and therefore, all employees must have the professional expertise, prior work in this sector, as well as the incentives offered by sector, so employees who are familiar with modern techniques are performed.

***ii.*** The public sector is subject to the acceptance of new graduates (mostly) and even if they were not experienced enough. Thus, this sector is the source of scientific and practical experiences and will be a loser for the departure of professionals to another sector.

***iii.***The contracts of private sector are (mostly) for small projects or just for parts of projects or for some activities. The quality could be more controlled; thus this may use a new and the best technology.

***iv.***The public sector is already subjected to the administrative laws; most of that legislation does not currently target knowing new technology; the major target is to complete the project with available facilities.

***v.*** For all mentioned in the preceding paragraphs, the questionnaire result showed that the private sector is technically better than the public sector, both with the partnership with foreign companies or without; this is the opinion of the staff working in the government sector.

***vi.***The field discussions have stated the need of public sector involvement with foreign companies to get modern technology; this partnership will improve the technical skills of professionals.

***vii.***The previous contracts in the eighties of the last century adopted by the public sector with large foreign firms yielded good results for both the public and private sectors in Iraq. In that time, there was a significant role for transferring technology.

**5.5 Working Previously / Recently with Foreign Company and Related to Construction Sector (Tasks)**: This question has two parts (working with foreign company and related this job to the construction sector) as follows in **Table 4.**

Although there are some of readings show absences of relationship between the work with foreign company and construction sector, they identified the need to modern technology, however; more than half of the respondents worked in the construction sector and this is a chance for transferring technology.

**5.6 The level of Technology Utilized by the Foreign Company:** This question was answered as expected with between very high level of technology and high, but some answers were provided as medium because the respondents see that technology presented by foreign companies was limited with scientific procedures or administrative systems and conformed with Iraq environment, so there is no high technology. **Fig. 5** shows the various responses for this question.

Although the largest rate (42 professionals) of respondents answers have unanimously agreed that the technology level was high, but there is a group of (15) professionals that referred to technology level with very high. This refers that more of the half of specimen confirm to the technical gab or need to bridge this gab. **Table 5** illustrates the statistics information for the technology level utilized by foreign companies. It is clear the (Mode) reading refers to results of (very high and high) respectively as well as the other readings (Std. Deviation and Variance).

**5.7 Sorting and Arranging the Best Technical (Techniques, Procedures and Systems)**

This question gives credence to the previous one, or complements it. There are four choices as follows:

a- The technology with modern mechanization and methods for use;

b- The scientific skills possessed by work team;

c- systematic Administration and managing the work according to authorities and responsibilities;

d- Following up the codes and standards.

The obtained results displaying in **Fig. 6** The largest rate was for the choice administrative system and work management in the division of responsibilities and authorities. This response came from groups who worked in years ago because no technical machines were used by foreign companies. **Fig. 6** shows also the proportion for each selection of the best technologies according to the professionals' assessment.

**5.8Technology of Foreign Companies is Outweighing the Technology of Companies in Public Sector:** This is a comparison on technology level between the foreign companies and companies in public sector; and the same comparison in the next question of the private sector and foreign companies; there are five levels for this comparison: 1-Very Low, 2- Low, 3- Medium, 4- High, and 5- Very High**.** The results are displayed in **Fig. 7** which shows respondents evaluation. The evaluation shows that foreign technology outweighed the public technology as well as the private technology. The rates of (very high) are (25) and (24) for public and private sectors respectively; and the same comparison rates of (high) are (41) and (40) respectively. These results can be considered as evidence of the superiority of foreign technology to technology in both public and private sectors.

**5.9 Technology of Foreign Companies is Outweighing the Technology of Companies in Private Sector:** The same previous comparison is conducted on technology level between the foreign companies and companies of the private sector. **Fig. 7** shows respondents evaluation; this chart presents three values of comparison.

Now, the result of the two Iraqi sectors (Public and Private) confirmed the necessary need for modern technology.

**5.10The Transferring or Exchanging of Technology is Adopted When Contracts are signed Fig. 8** illustrates this adoption and shows the lack of adoption of Transferring Technology as an important term for signing the contracts; it also trends to the normal situation in Iraq for this matter.

The degree of legal importance appears in adopting the technology transfer as one of contracts terms.

**5.11 The Transferring or Exchanging of Technology is Adopted When Contracts are Concluded. Fig. 9** shows the horizontal transferring in Iraqi environment and the level of available technologies by these organizations;

It seems the effect of contribution of Iraqi contracts trends to (Occasionally, Low and Very low) with score 24, 27 and 2 respectively.

**5.12 The Achievement of Technologies between Iraqi Organizations:** This is another scale for evaluating and achieving the Iraqi technologies (scientific, mechanization and administration) from local environment. **Fig. 10** shows the technology acquirement level from public and private sectors alike.

**5.13 Personal Procedures for Supporting or Encouraging the Technology Transfer**

**Fig. 11** displays the respondents contribution or (their procedures) to support or transfer technology (the first group)**.** The high percentage for: Submitting proposals for use the modern machineries to raise the level of production and the second was for: Submitting studies and periodic reports about work, and recommending changing the work methods if needed…, and etc. that means the professionals going on following-up the new technologies which utilized in the world as well as the method of work performance.

**5.14 The Reasons for Absence of the Personal Role for Transferring Technology**

**Fig. 12** shows the second group that has the role (weak and non-existent) for major obstacles or barriers that prevent to technology transfer. The Figure shows the major obstacles to prevent technology transfer is the role of top management for supporting the modern technology and with the close percentage the reason of lack of work team, while the other reasons have the same percentage.

## 6. CONCLUSIONS

Several conclusions were reached (for instance but not limited) as follows:

1- The variety of respondents in (Public and Private) sectors as well as the respondents from different Ministries, with different specializations and different scientific degrees, this led to get a respected view for evaluating the technology and its importance in construction sector.

2- The major obstacles for adopting the modern technology were: Absence of motivation in the (some) top management for accepting it, as well as a lack of capable work team for receiving and absorbing and applying it….etc.

3- The results strongly supported the contracts with foreign companies to improve the skills in public and private sectors alike to bridge the technical gap.

4- There is no clearly legal term in Iraqi contracts for transferring technology which signed between different sectors.

5- The utilized technologies recently do not meet the required specifications for executing the projects.

6- Respondents have contribution for transferring technology and in contrast there are different obstacles for preventing this process.

7- Last but not least; there is no care to the professionals who worked with foreign companies, to get benefits, and the interesting should be paid to them and encouraging to improve the work.

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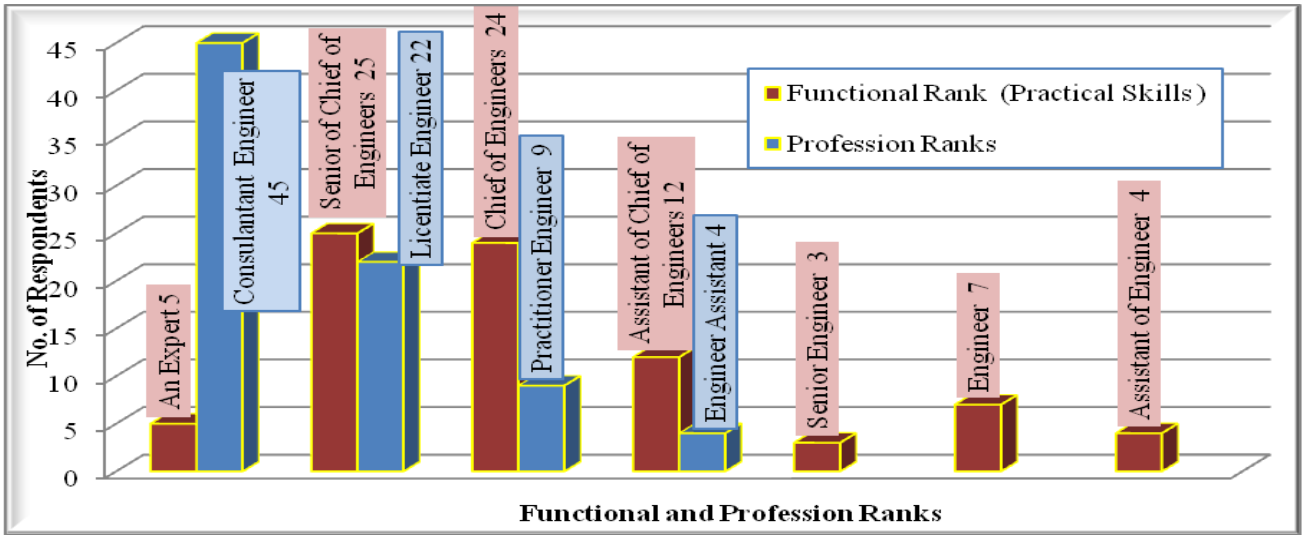


**Figure 1.** Functional and profession ranks of the respondents.

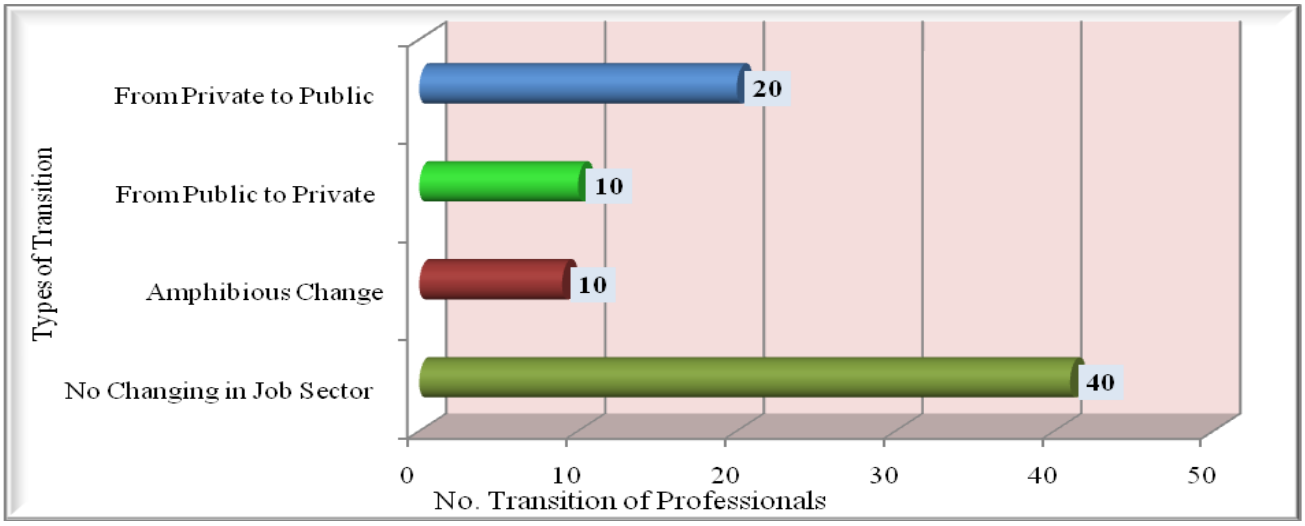


**Figure 2.** Transition of professionals between public and private sectors.

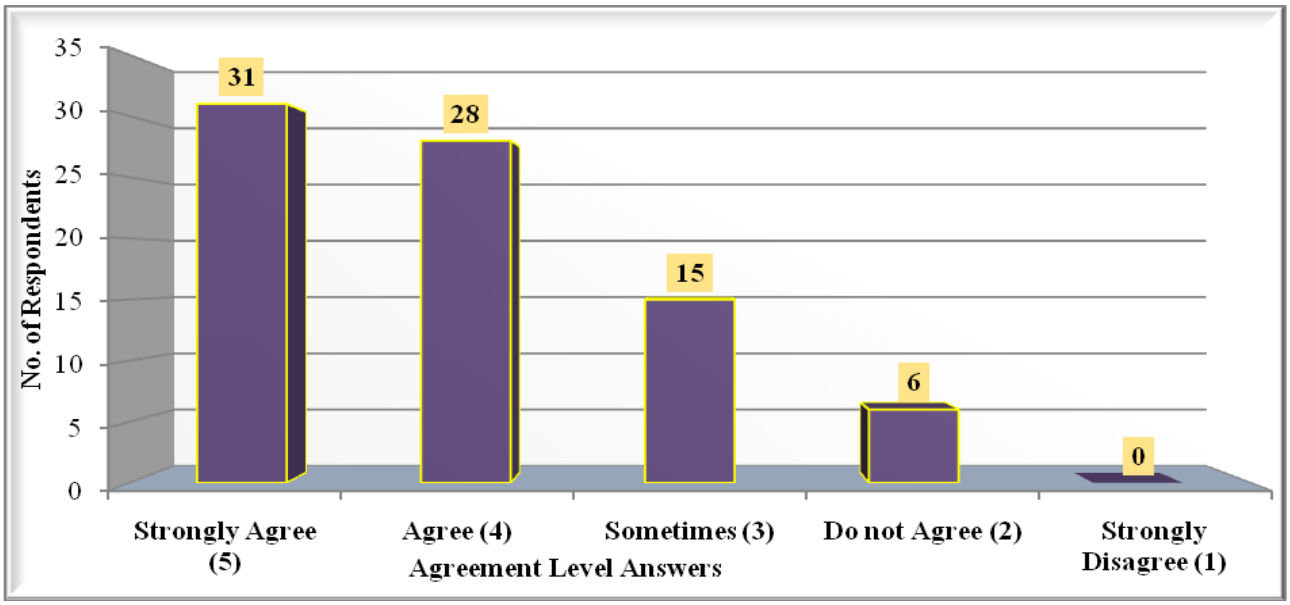


**Figure 3.** Respondents' opinion of the technology differences between sectors.

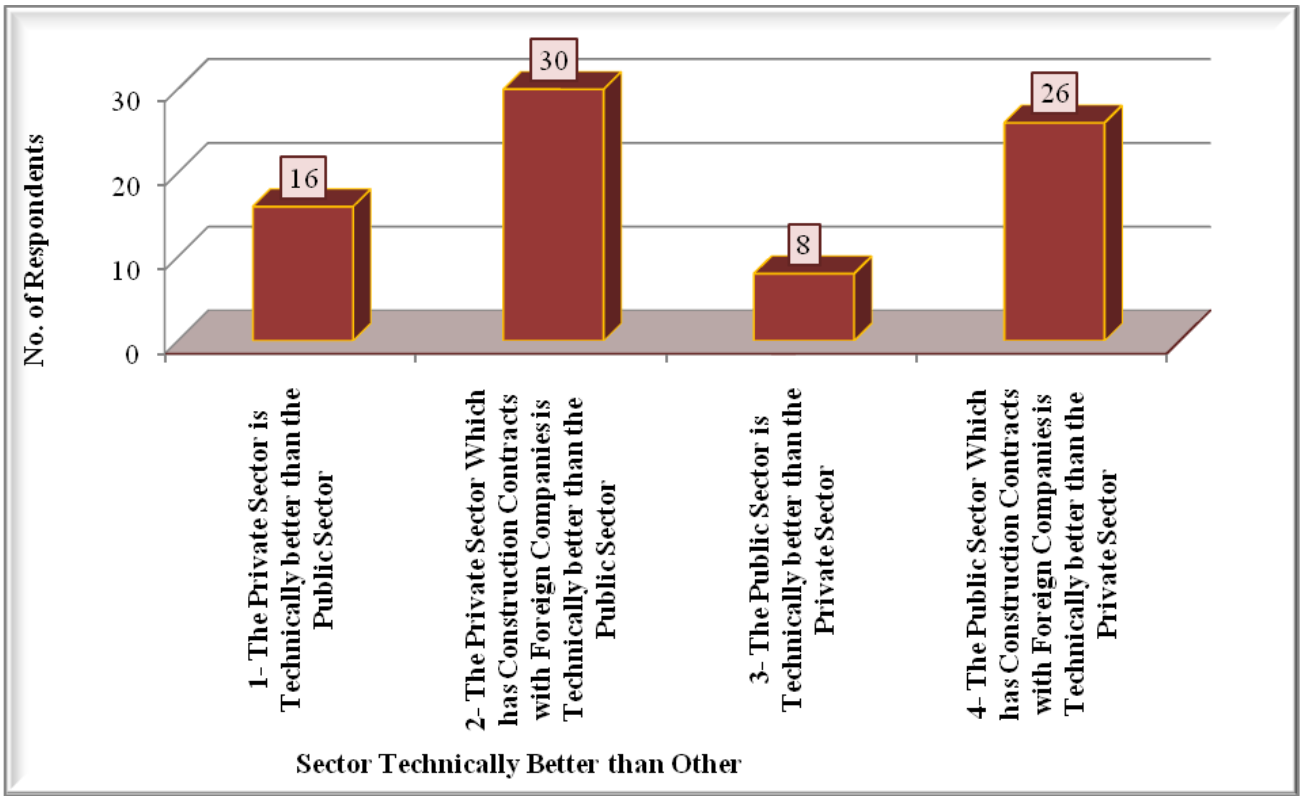


**Figure 4.** Comparison for selection of the technical sector.

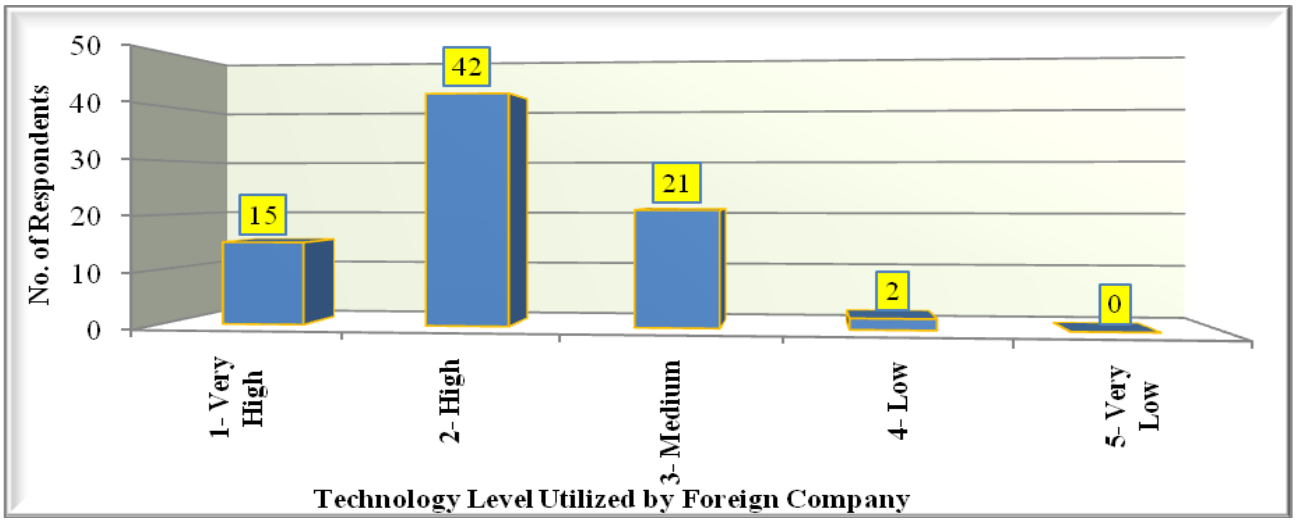


**Figure 5.** Technical level of foreign companies in previous work.

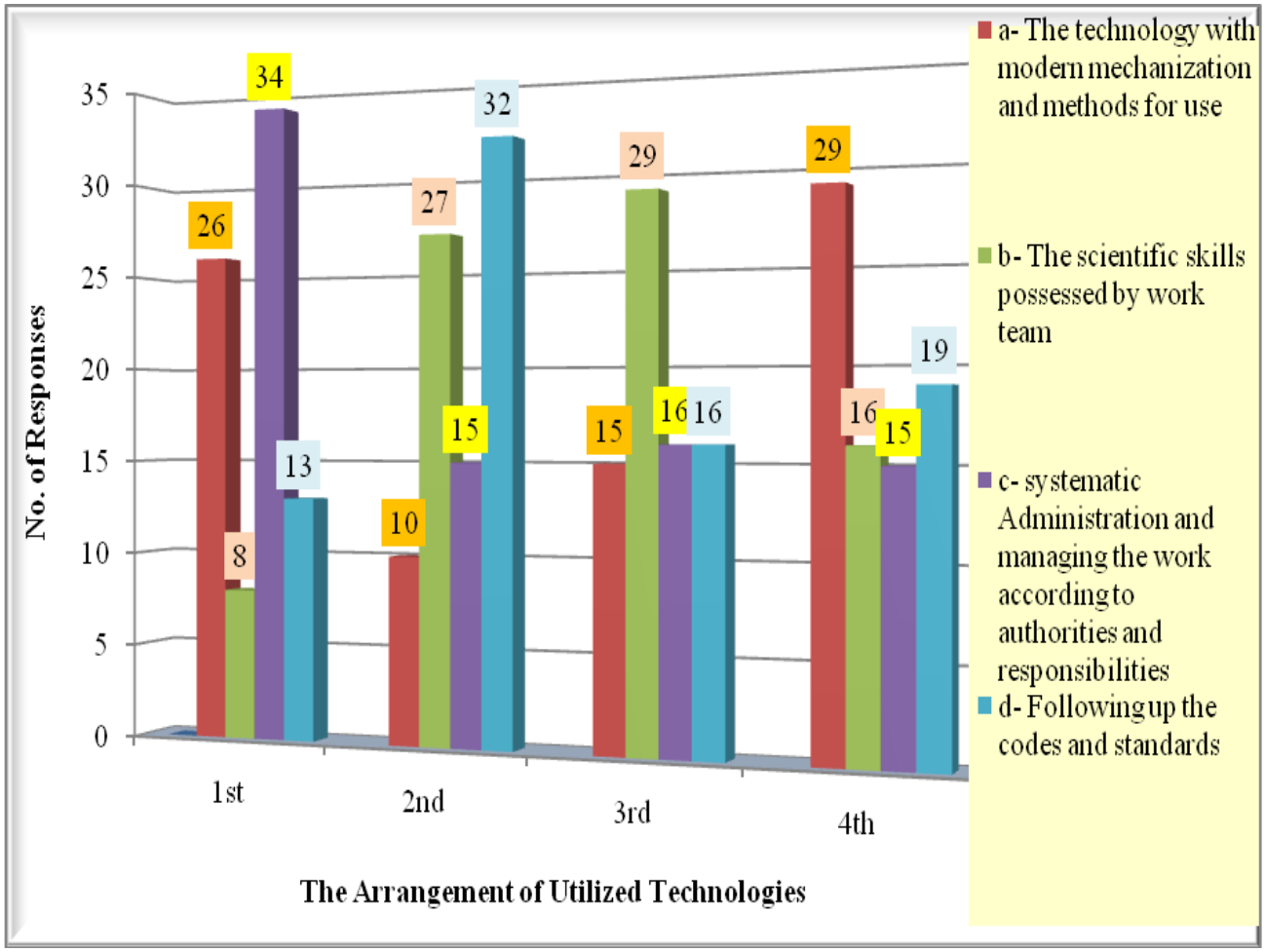


**Figure 6.** The arrangement of the best technologies.

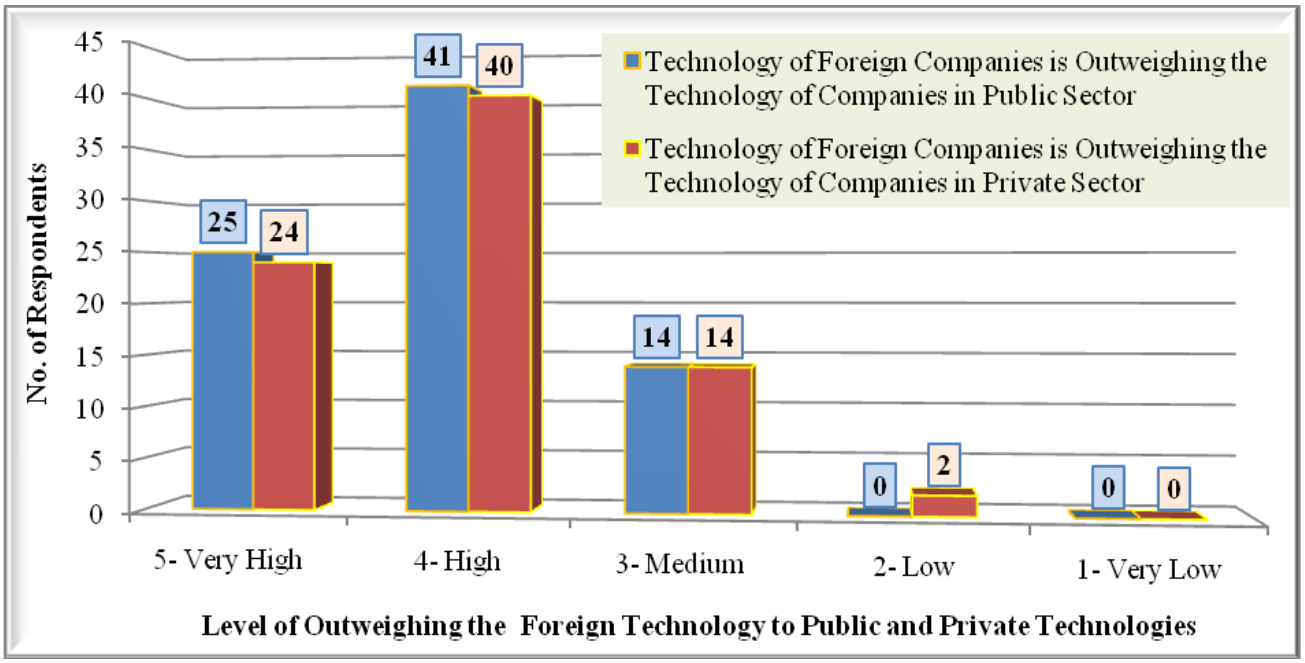


**Figure 7.** Weighting the foreign technology to public and private technologies.

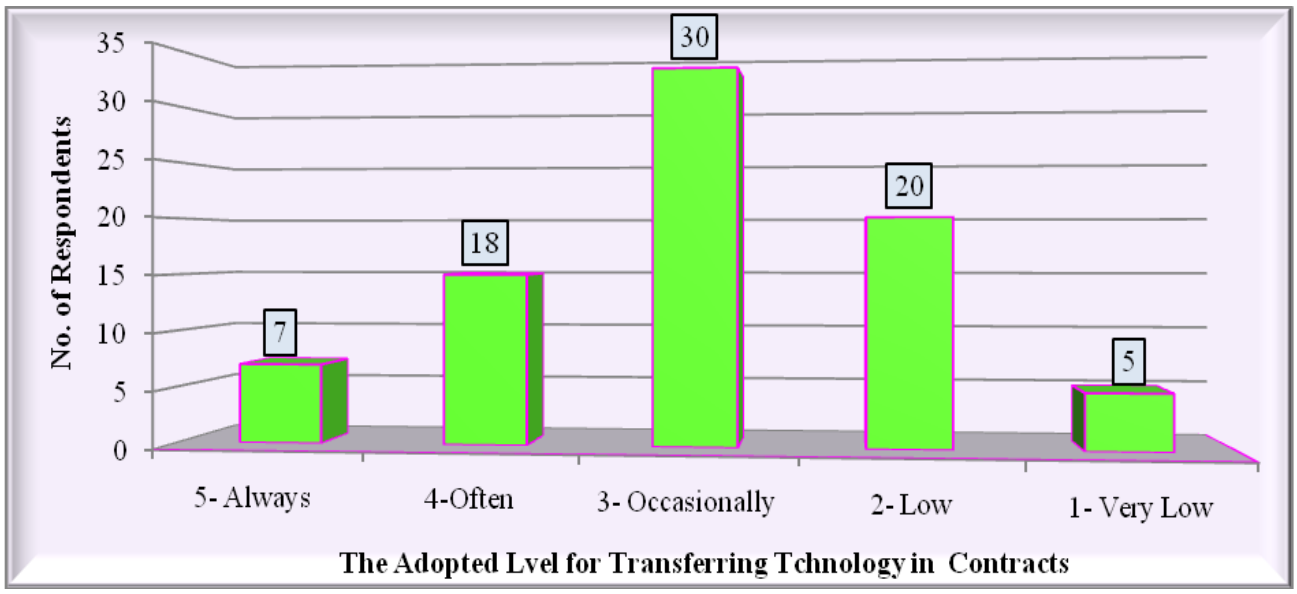


**Figure 8.**The legal term in a contract for transferring technology.

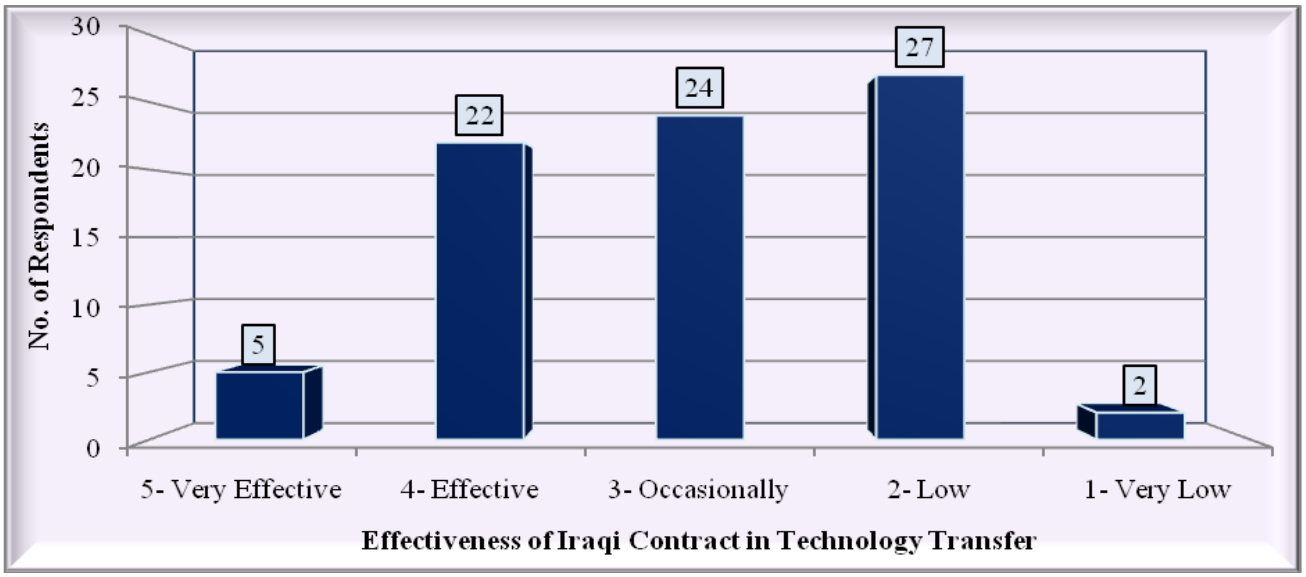


**Figure 9.** Contribution degree for technology transfer in iraqi contracts.

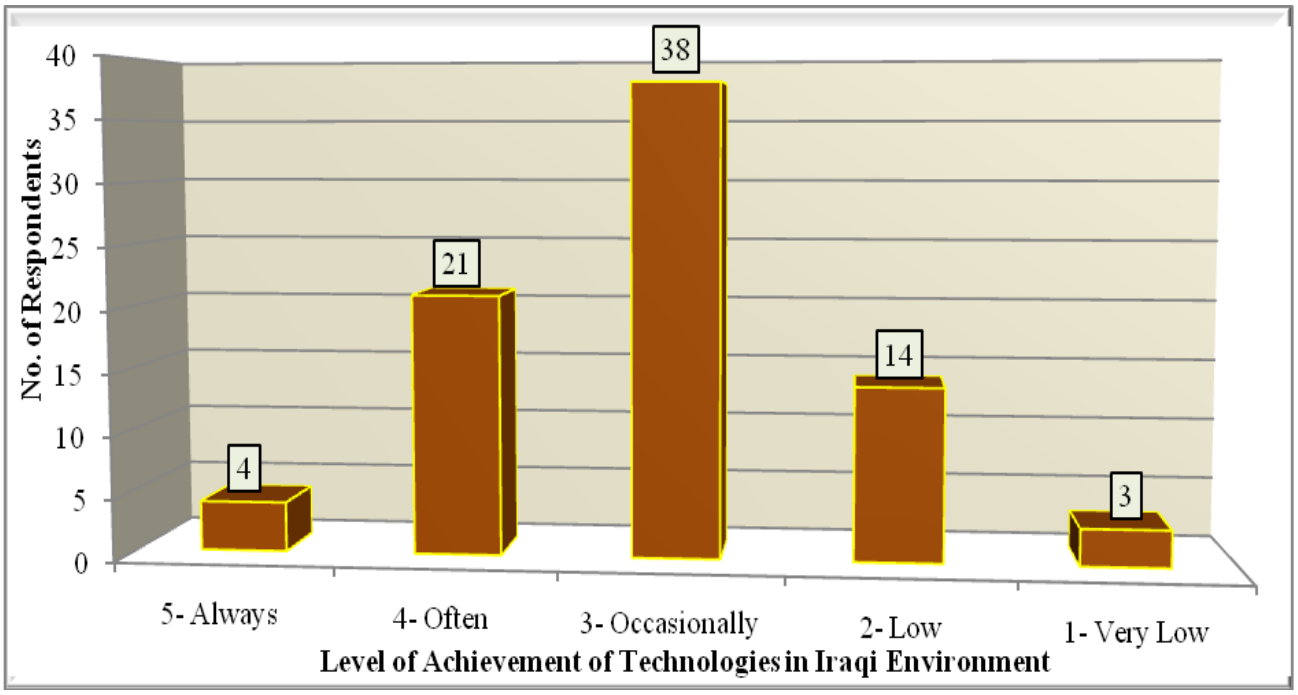


**Figure 10.**Technology achievement level from local environment.

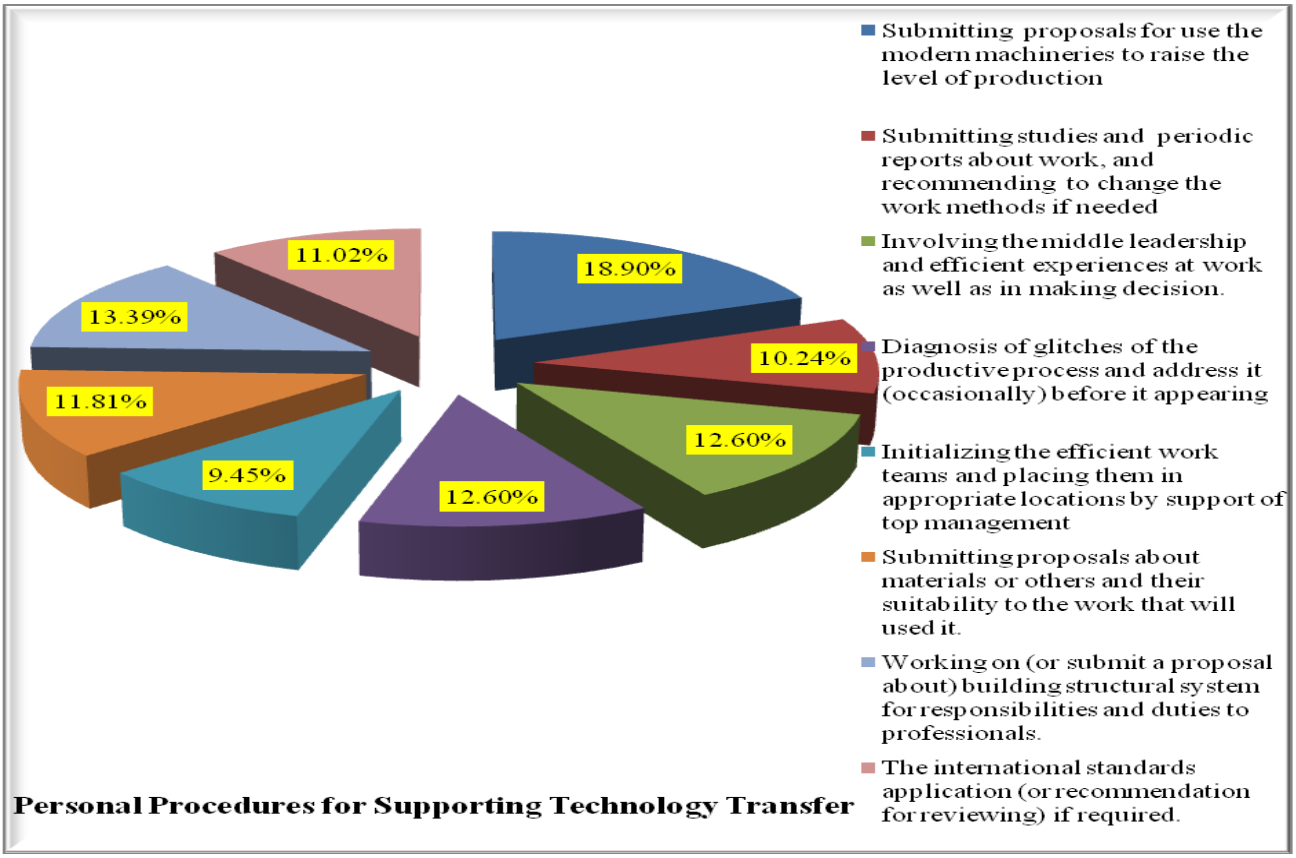


**Figure 11.** Personal procedures for supporting the transferring technology (the first group).

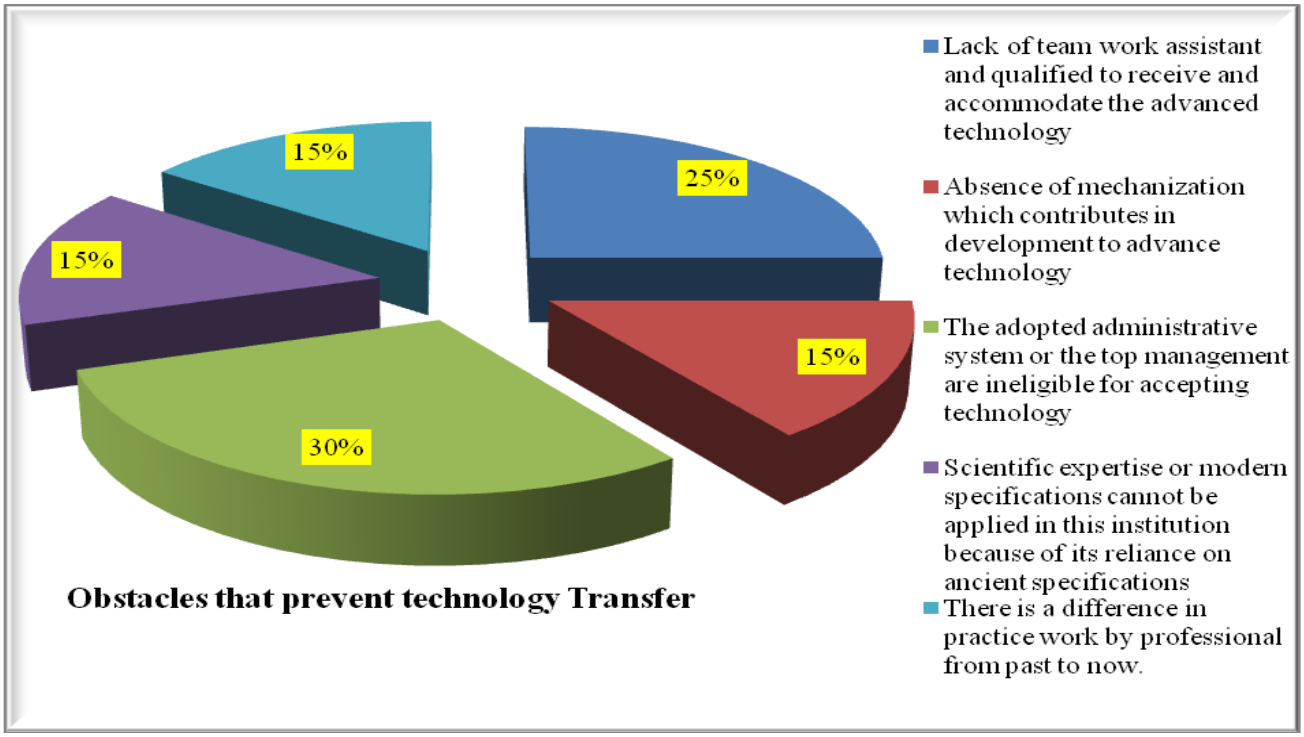


**Figure 12.** Obstacles or barriers that prevent the transfer of technology (second group).

**Table 1.** Different Specialization for Respondents in Public and Private Sector.

| Specialization / Public and Private Sectors | Civil | | | Mechanical | | | Electrical | Architectural | | | Chemical | | | Environmental | | | Urban & Regional Planning | | Production & Minerals | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | B | M | D | B | M | D | B | B | M | D | B | M | D | B | M | D | HD | D | B | |
| Ministry of Higher Education and Scientific Research | 2 | 5 | 3 | 2 | 2 | 1 | | | | | | | | | 1 | 2 | | 2 | | **20** |
| Ministry of Construction and Housing | 7 | 4 | | | | | | | 1 | 1 | | | | | | | | | | **13** |
| Ministry of Water Resources | 2 | 1 | | | | | | | | | | | | | | | | | | **3** |
| Ministry of Health | 2 | | | | | | 1 | | | | 2 | | | | | | | | | **5** |
| Mayoralty of Baghdad | | | | 3 | | | | | | | | | | | | | | 1 | | **4** |
| Ministry of Science and Technology | | | | | 1 | | | | | | 1 | | | | | | | | 1 | **3** |
| Ministry of Industry and Minerals | 3 | | | | | | | | | | 3 | | | | | | | | | **6** |
| Ministry of Electricity | | | | | | 1 | 3 | | | | | | | | | | | | | **5** |
| Ministry of Oil | 1 | | | | | | | | | | 1 | | | | | | | | | **2** |
| Ministry of Youth and Sport | | | | | | | 1 | | | | | | | | | | 1 | | | **2** |
| Different Private Companies | 6 | 5 | | 1 | | | | 4 | | | 1 | | | | | | | | | **17** |
| Total | **23** | **15** | **3** | **6** | **3** | **2** | **5** | **4** | **2** | **1** | **8** | | | | **1** | **2** | **1** | **3** | **1** | **80** |

Where B: Bachelor, H.D: High Diploma, M: Master and D: Doctorate

**Table 2.** Statistic descriptive for the agreement level in technology.

| Descriptive Statistics | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | N | Mean | Std. Deviation | Variance | Skewness | | Kurtosis | |
| | Statistic | Statistic | Statistic | Statistic | Statistic | Std. Error | Statistic | Std. Error |
| Specialization | 80 | 2.50 | 1.981 | 3.924 | 1.117 | .269 | .042 | .532 |
| Scientific Degree | 80 | 1.93 | 1.188 | 1.412 | .659 | .269 | -1.297- | .532 |
| Functional Ranks | 80 | 3.30 | 1.546 | 2.390 | .871 | .269 | .125 | .532 |
| Engineering Ranks | 80 | 1.65 | .873 | .762 | 1.223 | .269 | .652 | .532 |
| Agree Level | 80 | 4.05 | .940 | .884 | -.664- | .269 | -.503- | .532 |
| Valid N (list wise) | 80 | | | | | | | |

**Table 3.**Transition of professionals and the better technical sector .

| Better Technically / Transition | Transition of Professionals | | | | | Correlation |
|---|---|---|---|---|---|---|
| | 1- From Private to Public | 2- From Public to Private | 3- Amphibious Change | 4- No Changing in Job Sector | **Total** | |
| 1- The Private Sector is Technically better than the Public Sector | 4 | 4 | 2 | 3 | 13 | |
| 2- The Private Sector Which has Contracts with Foreign Companies is Technically better than other | 8 | 5 | 4 | 16 | 33 | 0.0580259 |
| 3- The Public Sector is Technically better than the Private Sector | 3 | 0 | 1 | 3 | 7 | |
| 4- The Public Sector Which has Contracts with Foreign Companies is Technically better than other | 5 | 1 | 3 | 18 | 27 | 0.976079 |
| Total | 20 | 10 | 10 | 40 | **80** | |

**Table 4.**Work in / with foreign company.

| Respondents Answers for Part 1 | Yes (Directly) | Yes (Indirectly) | No | Total |
|---|---|---|---|---|
| work with Foreign Company | 39 | 41 | 0 | 80 |
| **Respondents Answers for Part 2** | **Yes** | **Sometimes** | **No** | **Total** |
| Related to Construction Sector | 59 | 12 | 9 | 80 |

**Table 5.** Statistic information for the technology level .

| | | Sector | Specialization | Scientific Degree | Functional Ranks | Engineering Ranks | Technology Level |
|---|---|---|---|---|---|---|---|
| N | Valid | 80 | 80 | 80 | 80 | 80 | 80 |
| | Missing | 0 | 0 | 0 | 0 | 0 | 0 |
| Mean | | | 2.50 | 1.93 | 3.30 | 1.65 | 3.88 |
| Median | | | 1.00 | 1.00 | 3.00 | 1.00 | 4.00 |
| Mode | | | 1 | 1 | 3 | 1 | 4 |
| Std. Deviation | | | 1.981 | 1.188 | 1.546 | .873 | .736 |
| Variance | | | 3.924 | 1.412 | 2.390 | .762 | .541 |