



# Research on Problem of Installing Elevators in Old Communities

Xing Chen\*

The Experimental High School Attached to Beijing Normal University, Beijing, 100032, China

\*Corresponding author. Email: [m15810969664@163.com](mailto:m15810969664@163.com)

**Abstract.** With the further aging aggravation of China, the expectation of residents for the installation of elevators in existing residential buildings has also become increasingly strong. The installation of elevators in community housing has become a focus of people's livelihood, and has gradually become an important work of government public management. The installation of elevators has become a major livelihood work throughout the country. This paper analyses the demands of different subjects based on the questionnaire survey to enable the demands of key subjects in the project implementation process to be met. The paper gives the solutions of strengthening policy guidance, improving fund plan, and intensifying communication and cooperation to effectively solve the conflicts among different interest-related parties.

**Keywords:** Installing elevators, old communities, residents' willingness

## 1 Introduction

In recent years, the installation of elevators in old communities has been widely carried out throughout the country [1]. Some elderly people who can't go downstairs all the year round have regained their freedom of travel with the help of newly installed elevators. The existing multi-storey houses in cities and towns built before 2000 are almost not equipped with elevators. With the arrival of the aging society, residents are eager to install elevators in the old communities to solve the travel problems of the elderly. With the rapid development of urbanization and the aggravation of aging, we must vigorously promote the installation of elevators in old communities. Adding elevators has become a social issue of widespread concern to the public, but the process of adding elevators is not only difficult, but also contradictory. There are problems in coordination, communication, supervision, governance, and other aspects, which affect the progress of adding elevators. The project of installing elevators in old communities involves different interests of different subjects. With the stakeholder theory as the core, it analyses the demands of

© The Author(s) 2024

P. Dou and K. Zhang (eds.), *Proceedings of the 2023 International Conference on Economic Management, Financial Innovation and Public Service (EMFIPS 2023)*, Advances in Economics, Business and Management Research 287,

[https://doi.org/10.2991/978-94-6463-441-9\\_43](https://doi.org/10.2991/978-94-6463-441-9_43)

different subjects and aims to solve the problems of different subjects one by one. In the process of installing elevators in old communities, the importance of different subjects needs to be discussed. As the direct target of installing elevators in old communities, it is closely related to this project. Therefore, in the project management of installing elevators in old communities, we must fully refer to various influencing factors, which is very necessary for the implementation and promotion of the project. The special feature of the project of installing elevators in old communities is that it involves the security of the elderly. The government's starting point for the project is to build a popular project to ease the inconvenience of elderly care. However, based on the actual situation, the demands of residents on different floors are different, and so are the demands of the government and residents. Therefore, various stakeholders have different preferences for planning scheme decision-making. In the early stage of the project of installing elevators in old communities, it is necessary to coordinate the demands of different stakeholders to meet their demands. Therefore, this paper studies the appeals of the main stakeholders in the process of elevator increase to enhance the possibility of elevator increase and ensure the smooth completion of the project [2].

## **2 Current situations and problems of installing elevators in old communities**

### **2.1 Current situations of Installing Elevators in Old Communities**

Since the reform and opening, China's urbanization rate has increased from 17.9% in 1978 to 64.7% by the end of 2021, and the per capita urban residential area has increased from 6.7 square meters to 38.6 square meters [3]. The housing system of our country has also undergone earth shaking changes. In the process of transformation from a planned economy to a market economy, the housing system has transited from the original policy welfare housing distribution stage to the market stage, and the housing construction investment has also transited from the state and the unit to the market stage. At this stage, many elevators free residences with seven floors and below were built. In the *Government Work Report* of the last three years, the installation of elevators in old communities has been mentioned, which shows that the country is paying more and more attention to the installation of elevators in old communities. From the perspective of the policy documents on installing elevators in provincial old communities, most of them are work guidance, and the policy documents mainly involve implementation principles, work requirements, security measures, etc. According to the policy documents for installing elevators in old communities at the municipal level, most of them are the implementation rules and procedures for installing elevators in old communities, and the pilot cities for installing elevators are mainly concentrated in Beijing, Shanghai, Guangzhou, Nanjing, Hangzhou, Ningbo and other cities with better development [4]. Guangzhou was the first city to install elevators in old communities, and is currently the city with the largest number of elevators installed in old communities. Overall, the policies issued at the provincial level are more macro-oriented, and the policies issued at the

municipal level are more perfect. The installation of elevators in old communities is a real livelihood project, and the government plays an important role in promoting the project. In addition to the policy guidance, some provinces and cities in China also provide financial subsidies for the project of installing elevators in old communities, ranging from 100, 000 yuan/set to 700, 000 yuan/set. Compared with 2021, the planned number of elevators to be installed in old buildings in Beijing will double in 2022, with at least 1000 sets to 1500 sets [5].

## 2.2 Models of Installing Elevators in Old Communities

At present, there are mainly the following three modes of installing elevators in old communities [6]. First, lease mode post construction. The community property company or the industry committee entrusts a third-party professional company to carry out the preliminary work, construction management, post maintenance and other work of installing elevators in the entire old community, and residents pay fees to the third-party company on a frequency or regular basis; Second, the original ownership unit or collective investment model. This means that the original property right unit of the community is fully responsible for the installation, construction, and post management of elevators. The third mode is self-financing and self-construction by the owner. This is the way of installing elevators, the cost sharing ratio, and the later operation management method discussed by all owners of the old community, or the third party can be collectively invested to be responsible for the elevator installation and subsequent management. In addition to the above three common models, cities are also actively exploring a better model for installing elevators [7]. For example, Hangzhou has actively explored the "shared elevator" model. In the early stage, the "shared elevator" company will install elevators for residents free of charge, and will make appropriate compensation to residents on lower floors. In the later stage, when the elevator runs, it will charge residents for each ride. In addition, the "shared elevator" company can also enjoy benefits such as elevator advertising. In general, the installation of elevators in old communities in China is slow, and the existing elevator installation projects account for a relatively small proportion. The existing policies on the installation of elevators in old communities are insufficient, management means are lacking, and government support is limited. The proportion of elevators installed in old communities needs to be further improved [8].

## 2.3 Problems of Installing Elevators in Old Communities

Government: It is a systematic project involving multiple departments and strong spontaneity of the masses to install elevators in existing housing according to government policies. Without a clear set of laws, regulations and normative management, the elevator installation will not be carried out normally, but also lead to confusion. Since the installation of elevators in existing residences is a relatively new business, it is also a small number of projects that allow residents to participate in their own interests. If there is no adequate publicity and guidance, it will not only cause residents to misread and do not understand the policy, but also may cause

conflicts of interest and coordination problems. Therefore, it is more necessary for the government to take the initiative to play the role of overall planning and coordination to resolve the concerns of residents and improve the efficiency of work [9].

**Residents:** Adding elevators is a matter of vital interest to residents. Therefore, residents will pay special attention to their own interests. After the elevator is installed, it will inevitably lead to unbalanced interests, which will inevitably lead to differences and conflicts between residents on different floors. The elderly residents in the high-rise have an urgent hope for elevators; Because the low-rise residents will have the influence of lighting, ventilation, privacy, and security after installing elevators. Therefore, most of the low-rise residents are unwilling to install elevators, or they will demand compensation from the high-rise residents, or put forward different opinions on the proportion of cost sharing. On the other hand, the house price of high-rise residents will generally rise after installing elevators, both in terms of price and rent. In contrast, the house price of low-level residents will depreciate relatively. Therefore, conflicts of interest lead to difficulties in residents' coordination.

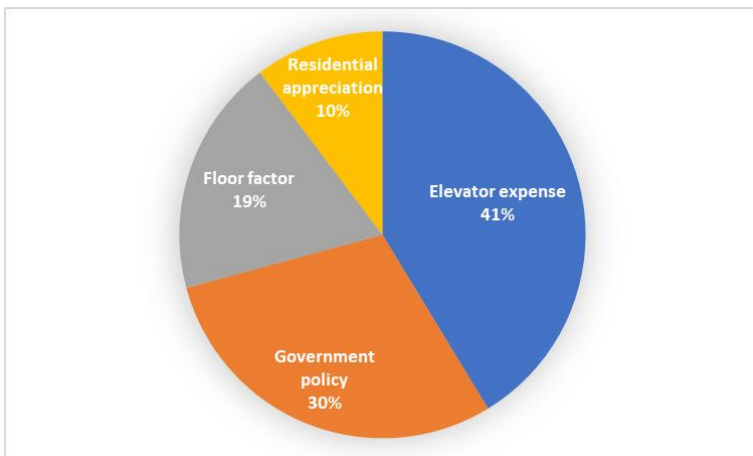
**Enterprise:** Although the government has actively explored the mode of renting instead of building for enterprises to install elevators in existing residential buildings, the cost of installing elevators is huge. Although the company will receive the corresponding subsidy from the government after the elevator is completed, the subsidy only accounts for a small part of the construction amount, and the remaining costs will be borne by the company. At present, the role of housing has also changed, from self-living to renting, and the group of renting houses is mainly young people. This kind of people think that the elevator is not the housing factor they consider. The passenger flow of the elevator will change significantly, making the ability to make use of it to make profits uncertain [10].

### **3 Demands Identification of Interest-Related Parties Based on Questionnaires**

#### **3.1 Demands Identification of Residents**

In the form of questionnaire, we conducted a survey on the demands and influencing factors of residents who installed elevators, and collected 126 valid questionnaires. Overall  $\alpha$  coefficient is 0.92, with high internal consistency and reliability. Most residents support the installation of elevators, the data result is 69%, and only 8% of them have no clear indication on the installation of elevators. About 41% of the respondents who are willing to install elevators said that the cost of installing elevators is the most sensitive. In addition to the one-time construction fund invested in the early stage, there are also maintenance costs in the subsequent use of elevators. Therefore, residents should coordinate the related costs of adding elevators. First, consider the allocation of funds for installing elevators for residents on different floors, and whether to make corresponding compensation for residents on lower

floors. The cost of installing an elevator is about 600, 000 yuan. In combination with the current situation of old buildings in Tianjin, the average investment per household is about 40, 000 yuan [11]. With the maintenance cost in the later period, it is undoubtedly a large expenditure for most families. If there is no clear document on the contribution of residents on each floor, or if there is any compensation for residents on lower floors, it will affect residents' willingness to install elevators. During the questionnaire survey, 30% of the respondents believed that the policy characteristics also played a role. Some residents were clear about the extent of the government's propaganda of the policy, whether the residents knew about the relevant policies, and whether the government had any compensation, but most of them knew that the residents did not know enough about the relevant policies. Some residents believe that the characteristics of needs have relatively little impact during the survey, because most of them are about 30 years old. Whether they live in high or low floors, the demand for elevators of this kind of residents is relatively weak.



**Fig. 1.** Proportions of first focus of residents for installing elevators (figure credit: original)

### 3.2 Demands Identification of Governments

In the form of questionnaire, we conducted a survey on the government's demands for installing elevators, and collected 10 valid questionnaires. Overall  $\alpha$  coefficient is 0.95, with good reliability. In the government, about 52% of people are most concerned about alleviating the aging crisis. At present, the aging population and other social contradictions are becoming increasingly prominent, and the installation of elevators has increasingly become the hope of the middle-aged and elderly in old communities. The people aspire for a better life, and the government has the responsibility and obligation to meet the expectations of the residents. Adding elevators is not only convenient for the elderly, but also for pregnant women and the disabled. If it is difficult for such people to go upstairs and downstairs, let alone go out to buy vegetables, take a walk in the park, etc., which greatly affects the quality of

life. About 28% of government officials expressed the view of relieving the pressure of transformation. Renovation usually means demolition and reconstruction. Renovation of old communities such as adding elevators can prolong the service life of buildings and prevent waste in building demolition. In the previous years, many rich people were removed from shantytowns, which also led to the difficulty of future demolition and relocation. The installation of elevators involves many disciplines, such as civil engineering, elevators, electromechanical, and related underground pipeline support. Driving industrial development is the focus of 20% of government officials on installing elevators [12]. In recent years, the development of urbanization has shifted from demolition and reconstruction to the reconstruction of old communities, resulting in new design research. As a new construction field, the installation of elevators has not been widely promoted, which involves many problems. This requires the joint efforts of design institutes, construction units, elevator manufacturers, experts, and scholars from universities, etc. to promote the installation of elevators in old communities.

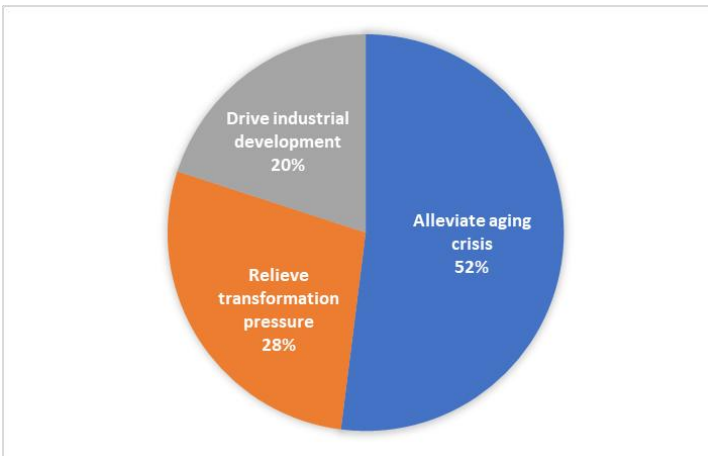


Fig. 2. Proportions of first focus of government officials for installing elevators (figure credit: original)

### 3.3 Demands Identification of Elevator Enterprises

In the form of questionnaire, we conducted a survey on the demands of enterprises installing elevators, and collected 62 valid questionnaires. Overall  $\alpha$  coefficient is 0.91, with good reliability. About 62.1% of employees said that profit is the core demand of elevator enterprises. The goal of an enterprise is to make profits. Only by making profits can an enterprise develop, invest in research and innovation, and make the industry develop healthily. According to statistics, there are many buildings that need to be equipped with elevators or have elevator doors. However, at this stage, the number of elevators added in each city is very small and cannot be industrialized. Enterprises should demand a way to make profits, which can not only expand the industry, but also cannot cut corners in order to make profits. After the early

development and the maturity of the elevator industry, enterprises will find a profit point from it. The remaining 37.9% of employees said that large-scale development is an important demand for elevator enterprises to install elevators [13]. As a new industry, enterprises in the early stage need to invest a lot of research, innovation, and other funds to install elevators in old communities. If the elevator installation industry cannot last, it will cause losses to the enterprise, loss of a large amount of early investment, and cause great harm to the elevator installation industry. In addition, if some small and medium-sized enterprises arbitrarily lower the cost to install elevators, the elevator quality cannot be guaranteed in the early stage, and maintenance cannot be done in the later stage, resulting in vicious competition, which will disrupt the market, make the market lose trust in enterprises, and cause the elevator industry to be unsustainable.

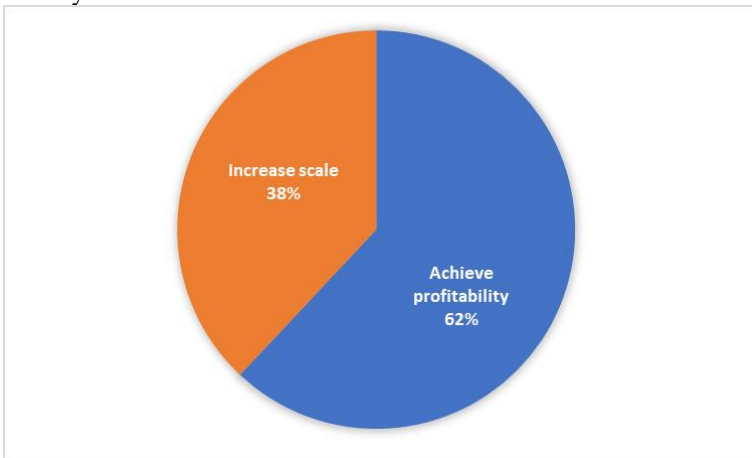


Fig. 3. Proportions of first focus of elevator enterprises for installing elevators (figure credit: original)

## 4 Solutions of Installing Elevators in Old Communities Based on Questionnaires

### 4.1 Strengthen Policy Guidance

The government should strengthen the role and status of the community in the follow-up policies, clarify the responsibilities of the government, residents, elevator enterprises and communities, and issue relevant regulations to stimulate the enthusiasm of the community to participate [14]. In addition, the government should increase the publicity of installing elevators, enrich the publicity content, and let residents fully understand the policies and subsidies. Broaden the publicity channels, evaluate the mature communities, and increase publicity. In addition, the residents' accumulation fund, special housing maintenance funds and government subsidies can be used for installing elevators and later maintenance, which plays a great role in improving residents' willingness to add elevators. For the area subsidy of low-level

residents, the subsidy behaviour of existing laws and regulations should be actively demonstrated and approved, so that the rights of low-level residents can be fully guaranteed. After completing the work of coordinating the interests of residents and raising funds, the Housing and Urban Rural Development Commission, the Market Supervision and Administration Bureau and the fire department need to actively cooperate, simplify the approval process on the premise of ensuring the safety of all work, so that residents can feel the power of the government, adhere to the principle of simplicity, quickness and accuracy, mobilize the enthusiasm of all departments, and jointly solve the problem of installing elevators in old communities, try to achieve the goal of one-stop service, optimize the approval process, and save time. Only in this way can we effectively improve work efficiency. For example, setting up an elevator audit window in an old residential area is convenient for residents to consult information and handle business. In addition, it also saves some certificates required for installation, increases the inspection work between departments, and carries out multi-dimensional review to simplify the process, thus saving approval time and making it convenient for the people.

#### **4.2 Improve Fund Plan**

We should continue to expand the scope of capital investment and look for sources of funds in many ways [15]. For communities with difficulty in raising funds, special maintenance funds for housing can be used, or users can be allowed to use public accumulation fund for elevator installation, which can be extended to residents' spouses and children. Through a variety of ways to help residents reduce economic pressure, but also can give residents enough sense of experience, improve residents' satisfaction. Finally, the government and other relevant departments need to call on other departments involved in elevator installation to participate in it, adjust the original management system, optimize the original design scheme of adding elevators together with experts, reduce unnecessary construction and save costs. We can solve the cost problem by stages or leasing according to the actual situation. In a word, the government should always focus on the economic interests of the masses, help them solve their doubts, and ensure that the installation of elevators can be carried out smoothly. The cost of installing elevators in old communities is high. It is difficult to popularize the installation of elevators in a large scale only by relying on residents' contributions and government subsidies, resulting in the project being unable to advance. Under the current circumstances, it is necessary to introduce social capital to raise funds. If the original community development unit is no longer available, new developers or community properties can be introduced for secondary development of the community. If the floor area ratio is increased, the area of residents on the first and second floors will be expanded, and the top floor will be covered. This part of the area can be sold as capital for installing elevators, or as compensation for lower floor owners. It can enable enterprises or social capital to add elevators as the main body of construction, without residents' investment in additional installation and later maintenance, and charge fees by time or monthly according to the intensity of residents' use of elevators, so that residents do not have to spend a large amount of



funds at a time. Enterprises and social capital can make full use of the advertising revenue in elevators as a supplement.

### **4.3 Intensify Communication and Cooperation**

As a grass-roots organization of the government, the community can keep abreast of changes in policies and effectively bridge the gap between residents and the government. In the actual construction process, the community can also communicate with enterprises in a timely manner, balance the interests of residents, the government, and enterprises, obtain the demands of the three parties in a timely manner, and transmit their complete information to the rest of the parties. In the installation of elevators in old communities, the consultation between residents is very important. It is difficult to reach an agreement and promote cooperation among residents if the residents only negotiate by themselves. Therefore, as the community manager, the community neighbourhood committee should play a relevant role, select appropriate and prestigious leaders, fully understand the demands and interests of residents, and meet the rationalization requirements of all owners. The neighbourhood committee of the community should play a good role as a bridge between the three parties to ensure the integrity of information obtained by all parties. Selecting the appropriate leader in the process of installing elevators in old communities can well mobilize and motivate residents, and select several active representatives, among whom those who know the construction industry, or are older and have higher prestige among residents, or have higher education can communicate with each other, which will help improve the efficiency of elevator addition. The strong demand of residents for professional resources is mainly due to their lack of knowledge about the construction industry and the installation of elevators, as well as the difficulty in communicating with maintenance companies, property companies and elevator companies. At this stage, the procedures for applying for elevator addition are relatively complicated, involving many departments and application processes. The construction unit for elevator installation is clear about the application regulations, and can be fully responsible by the construction unit. Adding elevators is not just simple installation, but involves old building reinforcement, pipeline cutting and modification, steel structure construction, etc., so the installation of elevators in old communities in the future needs more comprehensive and professional enterprises.

## **5 Conclusions**

Under the background that the country strongly advocates the installation of elevators in old communities, this paper conducts an in-depth study of the demands of the government, enterprises, and residents. Residents, as the main stakeholders of installing elevators, find out their willingness to install elevators through investigation and research on residents' demand and demand influencing factors. The project of installing elevators in old communities not only involves residents' consultation in the early stage, but also involves ensuring safety during construction and minimizing the

impact on residents' lives. In promoting the project of installing elevators in old communities, an all-round analysis of the whole process is required, which is the future research direction.

## References

1. Cho S S, Kong H S. Evaluation of Escape Safety Depending on the Number of Users of Residential Convenience Facilities in the Apartment Complex and the Kind of Elevators[J]. *International Journal of Advanced Culture Technology*, 2021, 9(4): 376-384.
2. Zou X. Design and Application of Prefabricated Basic Components of Additional Elevators in Existing Buildings Based on BIM[J]. *Forest Chemicals Review*, 2022(1): 489-496.
3. Dai X, Li Z, Ma L, et al. The spatio-temporal pattern and spatial effect of installation of lifts in old residential buildings: Evidence from Hangzhou in China[J]. *Land*, 2022, 11(9): 1600-1602.
4. Li S, Liu Z, Ye C. Community Renewal under Multi-Stakeholder Co-Governance: A Case Study of Shanghai's Inner City[J]. *Sustainability*, 2022, 14(9): 5491-5495.
5. Xiaojing Y, Xiaojuan H E. Experience and Implications of Foreign Countries Public Transportation under the Age-friendly Concept[C]//2022 7th International Conference on Social Sciences and Economic Development (ICSSSED 2022). Atlantis Press, 2022: 1877-1880.
6. Stock R. Broken elevators, temporalities of breakdown, and open data: how wheelchair mobility, social media activism and situated knowledge negotiate public transport systems[J]. *Mobilities*, 2022(3): 1-16.
7. Peng Y. Analysis on the Development Mode of Home Based Pension Real Estate[J]. *Journal of Mechanical, Civil and Industrial Engineering*, 2022, 3(1): 1-6.
8. Davoudi Kakhki F, Freeman S A, Mosher G A. Use of neural networks to identify safety prevention priorities in agro-manufacturing operations within commercial grain elevators[J]. *Applied Sciences*, 2019, 9(21): 4690-4692.
9. Onat A, Markon S. Theoretical and Experimental Analysis of Eddy Current Contactless Speed Sensors for Linear Motor Elevators[J]. *IEEE Sensors Journal*, 2022, 22(7): 6345-6352.
10. Qiu L, He C, Yi G, et al. Energy-based vibration modeling and solution of high-speed elevators considering the multi-direction coupling property[J]. *Energies*, 2020, 13(18): 4821-4823.
11. Vieira G F, Weiss J M G. Applications of template A3 and value-stream mapping in process improvement: the case of building elevators installation[J]. *Gestão & Produção*, 2021(2): 28-31.
12. Xing Z, Guo W, Liu J, et al. Toward the Sustainable Development of the Old Community: Proposing a Conceptual Framework Based on Meaning Change for Space Redesign of Old Communities and Conducting Design Practices[J]. *Sustainability*, 2022, 14(8): 4755.
13. Morelli N, Barello S, Mayan M, et al. Supporting family caregiver engagement in the care of old persons living in hard to reach communities: A scoping review[J]. *Health & social care in the community*, 2019, 27(6): 1363-1374.
14. Schmid M W, van Moorsel S J, Hahl T, et al. Effects of plant community history, soil legacy and plant diversity on soil microbial communities[J]. *Journal of Ecology*, 2021, 109(8): 3007-3023.

15. Isingoma B E, Mbugua S K, Karuri E G. Nutritional status of children 7–36 months old from millet consuming communities of Masindi District, Western Uganda[J]. BMC nutrition, 2019, 5(1): 1-8.

**Open Access** This chapter is licensed under the terms of the Creative Commons Attribution-NonCommercial 4.0 International License (<http://creativecommons.org/licenses/by-nc/4.0/>), which permits any noncommercial use, sharing, adaptation, distribution and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons license and indicate if changes were made.

The images or other third party material in this chapter are included in the chapter's Creative Commons license, unless indicated otherwise in a credit line to the material. If material is not included in the chapter's Creative Commons license and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission directly from the copyright holder.

