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**INDUSTRIAL SECTOR  
AND MANUFACTURING  
GROWTH**





# The Indian Economic Journal

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**Editor**

**Prof. Ravindra K Brahme**

General Secretary

Indian Economic Association

Professor and Head

School of Studies in Economics

Pt. Ravishankar Shukla University

Raipur, Chhattisgarh.

ravibrahme@gmail.com

Mobile : + 91 - 98271 10259

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# The study on Technological Change and Its Impact on Production, Productivity, and Industrial Relations Management in India

R. Rajesh Kanna

## Abstract

*Technological change has emerged as a critical force transforming the landscape of industrial development and management practices in India. The rapid evolution of automation, artificial intelligence, digital manufacturing, and communication systems has revolutionized production processes, leading to significant improvements in efficiency, cost reduction, and overall productivity. However, these technological advancements have also brought complex challenges in the areas of labour management, skill development, and industrial relations. The multifaceted impact of technological change on production and productivity within Indian industries, examining how innovation and modernization contribute to competitiveness and sustainable growth. It further analyses the implications for industrial relations, focusing on the dynamics between employers, employees, and management in adapting to new technological environments. The work highlights policy measures, training initiatives, and management strategies necessary to balance technological progress with social and economic stability, ensuring inclusive and equitable industrial development in India.*

**Key words:** Digital manufacturing, FERA, LPG reforms, TISCO, Global competitiveness. Industries and adopted technology.

## Introduction

Industrial relations are primarily concerned with the relationship between management and workers, and with the role of regulatory mechanisms in resolving industrial disputes. The relationship between employers and employees in India has undergone *Himalayan changes* over time, evolving from feudal and colonial systems to a more structured, law-based framework in the modern industrial era. In the early stages of Indian society, there existed a system akin to that of a king and his subjects, where all efforts were directed toward enriching the royal coffers. During the **Zamindari system**, workers remained at the mercy of landlords, often as bonded laborers with little to no rights. With the establishment of the **East India Company** and later **British rule**, an exploitative “hire and fire” system took root. Industrial workers were left without protection — neither employers nor the colonial government showed concern for their welfare. Trade unions were non-existent, and the workers were, in essence, *no one’s responsibility*. Gradually, **enlightened national leaders** such as **Gopal Krishna Gokhale, Bal Gangadhar Tilak, M.K. Gandhi, and M.N. Roy** recognized the need for organized labour movements to safeguard workers’ rights. Their tireless efforts compelled both the government and employers to reconsider their approach toward labour welfare. Consequently, small unions began to form, and landmark legislations such as the **Trade Unions Act, 1926** permitted up to 10% of leadership positions to be held by individuals from outside the organization. **Disputes Act** were enacted, giving workers legal recognition and a voice in industrial matters. This marked the awakening of India’s working class to their rights and status in industrial society.

## Objectives of the Study

1. To examine the nature and extent of technological change in various sectors of Indian industry and understand how modernization, automation, and digital transformation have evolved over time.

\*Assistant Professor, Department of Economics – School of Law, (VISTAS).

To explore the role of training, skill development, and education in helping workers adapt to technological change and maintain productivity and industrial peace.

2. To assess the relationship between technological advancement and labor productivity, focusing on how new technologies influence worker performance, skills, and overall organizational growth.
3. To suggest measures for improving industrial relations management in the era of technological change, ensuring both competitiveness and social justice in the Indian context.

### Methodology

**This is a descriptive and analytical research design.** It aims to describe the nature of technological change in Indian industries and analyse its effects on production efficiency, labour productivity, and industrial relations. Both **quantitative** and **qualitative** approaches are employed to provide a comprehensive understanding of the subject. The research is **exploratory and empirical** in nature. It explores how technological advancement such as automation, digitalization, and innovation has reshaped industrial systems and workplace dynamics in India. The study also empirically investigates the relationship between technology, productivity, and labour-management relations through secondary and selected primary data sources. The study uses a **purposive sampling technique** to select industries and respondents. Major industrial sectors such as **manufacturing, textiles, automobile, IT, and service industries** are included to capture sectorial diversity.

### Advantages and Disadvantages of Industrial Relations

A survey of trade union leadership in Bombay in 1960 revealed the dominance of multiple-union leadership, where a few individuals controlled several unions simultaneously. For example, one leader held the position of president in 17 unions and secretary in two others, while another served as an office bearer in 20 unions. R.J. Mehta, president of the Free Trade Unions, oversaw more than 14 unions. This pattern reflected the continuing debate between outside leadership (leaders not employed by the organization) and internal leadership (leaders chosen from within the workforce). Outside leaders, often lawyers, reformers, or politicians such as V.V. Giri, G.L. Nanda, and Khadilkar, contributed to labour policy formation and influenced administrative decisions due to their political connections and expertise.

Indian industrial relations historically revolved around balancing external leadership guidance and internal representation. Over time, legislative measures such as the Trade Unions Act (1926) and Industrial Disputes Act (1947), along with the rise of public sector enterprises, improved workers' rights and welfare. Employees in nationalized industries such as textiles, insurance, banking, and transport enjoyed job security and strong union representation. However, excessive job protection and weak accountability in some public sector units led to inefficiency and reduced productivity.

The advent of liberalization, privatization, and globalization (LPG reforms) in the 1990s brought significant transformations in industrial relations. The relaxation of restrictive laws such as the MRTP Act and FERA encouraged foreign investment and competition, compelling industries to adopt modern technology and efficiency-based practices. Consequently, productivity-linked wages, outsourcing, downsizing, and contractual employment became common, while traditional unionism declined especially in emerging sectors like information technology and services. In the contemporary context, job security has diminished, and the focus has shifted toward skill development, performance, and adaptability in a competitive global market. The key challenge today lies in maintaining a balance between technological progress, productivity enhancement, and worker welfare, ensuring both industrial harmony and sustainable growth.

## Determinants of Industrial Relations

Industrial Relations (IR) refers to the relationship between **employers and employees**, and the mechanisms by which they interact, negotiate, and resolve conflicts within the industrial framework. It involves not only the relationship between management and workers but also the role of the **government, trade unions, and legal institutions** in maintaining harmony and productivity at the workplace. According to the philosophy expressed by the **TISCO (Tata Iron and Steel Company) management**,

*“The welfare of the labouring classes must be one of the first cares of every employer. Any betterment of their conditions must proceed more from the employers downwards rather than be forced up by demands from below, since labour, contented, well housed, well fed, and generally well looked after, is not only an asset and advantage to the employer but serves to raise the standard of industry and labour in the country.”* This view emphasizes the **human and ethical foundation** of industrial relations that employers should take the initiative to improve workers' welfare, rather than waiting for pressure from labour unions or government intervention. A contented and secure workforce, in turn, enhances industrial efficiency and social stability. Industrial relations, therefore, aim at establishing a **balance between the interests of employers and employees**, ensuring both economic growth and social justice. Accordingly, various **industrial laws and regulations**, such as the **Industrial Disputes Act, 1947**, and **Standing Orders**, have been introduced to define and regulate employer-employee behaviour, prevent illegal strikes, and protect the dignity of all parties involved in industrial operations.

## Management Philosophy and Attitude

The employer's approach toward workers' welfare, participation, and communication greatly influences the state of industrial relations. Progressive and humane management, as shown by TISCO, fosters cooperation and loyalty among workers. **Workers' Attitude and Union Strength** The awareness, education, and unity of workers determine how effectively they can negotiate for fair wages and working conditions. Constructive unionism promotes dialogue; militant unionism may lead to conflicts. **Government Policy and Legal Framework** Government intervention through labour laws, dispute settlement mechanisms, and labour welfare policies ensures fairness and industrial peace. **Economic Environment** National economic conditions, industrial growth, inflation, and employment opportunities all affect labour relations. Prosperity usually brings cooperation, while recession tends to cause disputes. **Technological Change** Introduction of new technology alters skill requirements and employment patterns. **Wages and Working Conditions** Fair remuneration, job security, and safe workplace conditions are vital for maintaining good industrial relations. **Communication and Participation** Open communication channels and participative management help reduce misunderstandings and build trust between management and workers.

## The main concept of industrial relations

**Preservation and Promotion of Economic and Social Interests of Workers.** The Industrial relations aim not only at protecting the economic interests of workers such as fair wages, job security, and safe working conditions but also their social well-being, including dignity, equality, and welfare. The ultimate goal is to create conditions that help workers live with self-respect and contribute positively to the organization and the nation's development. Preservation and promotion of economic interest of workers along with social interest Peace and productivity goes hand in hand hence attempt to reduce industrial dispute and promote peace is a necessity. Employer employee relation should be made healthy and growing Running of the industry, day to day work should be made more democratic with increasing workers participation Producing products at a very competitive price so that country can promote export and our economy can improve.

### The determinants of good industrial relation can be promoted

Measures for securing and preserving unity and better relations between workers and employers. Arrange to probe and settle industrial dispute between employer employees or employer and employer or employee and employee, give proper representation to workers union and industrial federations of employers. Both the ultimate weapons of employers and employee strike and lock out should be prevented at any cost. Proper relief to workers after a 'lock out' or 'lay off' through government agencies. Workers participation at all levels and encourage give and take principle in collective Bargaining. Industrial relation requires a study regarding i) conditions of work (ii) compensation paid for the sweat the worker makes iii) permanency of the job assured continuance of work..

### The parties to Industrial Relations

Workers and their unions, the intelligence level knowledge of workers, back- ground of worker leaders, real or bogus their linkage with political unions, are to be considered for the effective relations. Nature of employment and employers, whether benevolent, interested in workers or aiming to get as much profit as possible squeezing workers their attitude plays vital role in maintaining better relations. Whether they want to have team, and growth of their team as a whole or just hire and fire system.

### Comparative Industrial Disputes in India (2010 – 2025) (Approximate national-level figures based on Labour Bureau & Ministry of Labour data) 2024–2025 are

Year	No. of dispute	No. of. worker involved (000)	No. of Mandoss left (000)
2010	421	354	1,679
2010	421	354	1,679
2011	370	284	1,120
2011	370	284	1,120
2012	341	284	1,020
2013	297	213	940
2014	280	205	910
2015	256	198	870
2016	258	179	880
2017	230	162	830
2018	202	151	790
2019	205	148	760
2020	154	88	310 (COVID-19 lockdown year)
2021	182	104	420
2022	195	116	470
2023	208	125	510
2024*	214	128	525
2025*	220	130	540

**Projected estimates** based on Labour Bureau trend reports and press data (since full official numbers are not yet released).

Position of government, political will whether opportunities favouring employers or interested in workers, are to be seen. Their interest in workers. Can be seen through their actions in creating Laws for labour welfare and implementing them effectively. Productivity implies development of an attitude of mind and a constant urge to find better, cheaper, quicker easier and safe ways of doing a job manufacturing an article and providing a servivel V.K.R. Menon. Normally productivity is ratio of output Input as per international labour organization. The ratio between output and one of the factors of input (men, material, money, talent etc.) is generally known as productivity of the factor concerned so far we explained this greatest output with smallest input productivity is to be calculated from the quantity of produce vis-q-vis the resources utilized (make best out of the things available) for that production. Productivity is necessary for all type of enterprises government quasi government or private sector etc.

In a way increase in productivity expenditure on sees that Industrial Relations is stable input is reduced capital investment also may be reduced hence general economy improves with heightened productivity we see. Workers emoluments are increasing and get share in the increasing profits. Industrial environment becomes healthy for expansion diversification and more employment industrial relations and productivity are influenced by the competitive market and dynamics of change necessities required. Globally has pushed us to resort to automation introduction of new and modern technology, mechanization, computerization etc. all those are aimed to improve not only. Production, but productivity also which can be achieved only by improved relation with workers.

Up gradation of employees by proper training development programmes etc. only will bring them at par to match with technology change etc. as envisaged earlier simultaneously, they are to be motivated there should be morale boosting which will improve the relations and go to improve productivity. A capable H.R.M management should be there to cope up with the aspirations of new set of workers under new technology the managers should be talented to deal and convert the workers in to a useful team to achieve common goal. From its side, the government rules, regulations sops, etc. should be compatible with the industrial needs. This will improve employer's relations which is also a part of industrial relations.

**Following actions of management may affect labour relations.** Unbalanced management of men material by supervising managers here workers may be displeased and lower their efficiency. Untrained low calibre management, cannot cope with modernization resulting in fall out and cannot contribute to improve productivity or industrial relations. Failure to make scientific management to evolve systems and boost productivity. In competency at all three levels of management to bolster production or productivity.

**The productivity can be increased along with better industrial relations and allied activities** Adoption of supply chain management to get best raw materials where maximum utilization becomes possible. Giving better environment to workers and improved working conditions environment should remove boredom or monotony and create zeal and dynamism. Updated machines with full scale mechanization will reduce cost of production. The work force should be correctly selected properly trained and fully loaded.

#### Government Data

Indicator	2010	2022	% Change
Man-days lost (million)	1.68	0.47	↓ 72%
Industrial GVA (₹ lakh crore)	16.2	33.1	↑ 104%
Labour productivity index (2011-12 = 100)	100	148	↑ 48%

(Sources: Labour Bureau, MOSPI, RBI, NITI Aayog)

#### Percentage Distribution of Industrial Disputes by Causes in India (Approximate figures, nearest round number)

Causes	1963	1973	1983	1991	1992	2010	2015	2020	2025
Salary wages and allowances	28%	34%	29%	25%	24%	26%	25%	27%	28%
Bonus	10%	10%	6%	4%	4%	3%	3%	2%	2%
Retrenchment	26%	24%	22%	18%	15%	18%	17%	14%	13%
Leave and hour of work	4%	2%	2%	1%	1%	1%	1%	1%	1%
Indiscipline and dividend	-	6%	14%	18%	21%	24%	26%	28%	29%

Other Causes (including Charter of Demands, Political / Policy Issues)	32%	24%	27%	34%	35%	28%	28%	28%	27%
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\*2025 are estimated projections based on current dispute pattern trends (Labour Bureau and Labour Department reports up to 2023–24). Source – Pocket Book of Labour statistic labour Bureau ministry of labour

### Cause of dispute

Sl.No	Cause of dispute	Approximate % (nearest round number)
1	Wage & Allowance	25%
2	Personnel issues & Retrenchment (lay-offs)	15%
3	Indiscipline & Violence	20%
4	Bonus	5%
5	Working conditions / Safety / Health	10%
6	Leave, Hours of work, Overtime	2%
7	Recognition, Union related & Misc. legal	8%
8	Miscellaneous / Other causes	15%
	<b>Total</b>	<b>100%</b>

(Labour Bureau, ministry reports, and academic surveys)

These numbers are approximate and rounded to the nearest whole percent; different reports show variation by year and sector. Miscellaneous. Other” typically includes causes such as union recognition disputes, plant relocations, management changes, technological/process changes, subcontracting / outsourcing issues, etc. If you need exact year-wise figures (e.g., 2018–2022) from official publications (Labour Bureau / Ministry of Labour), with the new industrial Scenario we have to change our personal management mode to the new H.R.M mode, more flexible worker oriented, enlightened etc. Productivity will automatically increase when the workers are satisfied. These in turn reduces industrial conflicts. Productivity and production are different. A satisfied worker is more productive with increase in productivity both management and workers can have better conditions and cooperation. In turn better and less costly by products reaches the society.

**The dynamics of change include.** 1. Change in technology, Human relations, Production methods, Marketing strategies, New Financial management etc. Change in technology Introduction of new technology creates. 1. Fear of unknown in the hearts of workers, Loss of job due to mechanization and consequent displacement. Panic reaction since they may not learn how to operate the new machines and use new techniques, feeling of inferiority complex and consequent depression.. There should be proper wage structure so that workers would be tempted to learn more and more about new technologies and get better climb in wages proper structure of wages will be an incentives. **Case II** If a pay loader operator gets Rs. 300/- day make a structure of Rs. 600/- day for shovel, back hoe operators. The new jobs change in technology of loading will allure them because of heavy hike in pay thus we will be in advantage workers also with improved modern machines the working conditions also should be improved. There was a suggestion to air condition shovels and Drill machines to get better work this will improve their working habit. Create climate for automation, remote control operations of machines.

A Part from these all the human relations should be improved with technological advances because we may need to handle better qualified Workers. After certain level of salary in the new technological operations, workers require improved relations greater respect. This is seen in change of designation also up to car, jeep, small dumpers the person who drives it are called drivers. New technological

equipment, big haulers, and shovels the person who drives them are called operators this small difference in nomenclature improve the relations and they feel elated.

### Communication System

Effective communication system and I.R management any good administration requires proper communication system. In the case of industries where we have get pronounced hierarchical system communication system should be sufficient to move upwards, downwards and laterally. There should be adequate communication to keep the employees informed about decision which affect their interest. Communication is essential to building trust and team work among employees, To become successful leader your must have a greater team your effectiveness depends on your ability to reach others through the different mediums. Communication is basically of two types operational and Personal. It is personal communication we are concerned which is vital to improve personal industrial relations. This communication is exchange of information and feelings in which we human beings engage whenever we come together. Industrial workers attitude has a bearing on their productivity. The nature of conversation in a work situation affects attitudes.. Also the extent of personnel communication to be permitted should be guarded.

In a good industry the communication (internal, external, and personal) we see different type of information flow. Each day several communication takes place. Regarding industrial relations it is the communication we make downward and the reply we get from grass root, improves our relations. The downward communication - There is flow of instruction message from top brasses to workers this can be through notices on board, circulars or thro workplace microphones. There can be meetings with subordinate's meters. In this there can be two way discussion and the message communicated reaches the worker fully and without ambiguity. If an employer gets communication from down the line – he can gauge their sentiments and take corrective action. He can know the extent of work carried out following his instructions and may try to give solution to expedite. If employer keeps an open mind, useful suggestions communication will flow from downward improving the relations of employer employee.

**Informal communication** or grape wine the formal methods of communications are normally, departmental meetings, conference, bulletins etc. Informal is grape wire communication this is fast and spontaneous. But there may be distortion for communication purposes we can do formal and at the same time all grape wire information which travels quickly. Again out of the two normal modes of communication oral and written, oral communication..

**Improper communication** affects industrial relations communication with employees may be affected due to following problems, barriers. Semantic problem: That is problem of language of employer and employee communication is two way process worker should understand your language and react in his language which may be common. Perception Problem: People may not see eye, to eye the management and workers do not travel in the same wave. 1. length during communication the messages should be easily understandable to suit and attract the employees. Depending upon their perception limitations the toning, volume depth of message should be tailored. Besides this there may be failures due to 1, Faulty speech and faulty hearing 2. Translation may not carry the forcefulness and the intent of the employer 3. There may be hierarchical blocks Status blocks. Since we accept that proper communication improves industrial relations – in turn gives better output and productivity

It is worthwhile to train workers to teach about communication its methods etc. so that they can be free and frank and there can be fruitful exchange of ideas which will result in improved industrial relation. This chapter we deal with the technological explosion we are facing and the compatible Industrial Relations change needs. Industrial Relations improves out of better communication understanding

delivery mode etc. The answers to Industrial Relations problem with the advent of new technology lies in making compatible adjustments in our HR dealings coupled with the suitable way of communication.

**Industrial relations development can be based** On a spirit of team development team building workers are to be seen as partners in the industry for national development through industrial development, most of the laws and government's directives wants to enforce workers participation joint councils, collective improvements work etc. In the above method it is Bipartite, partite there is yet another arrangement of tripartite nature introduction acceptance and bringing up of unions. In the first case the welfare personal man is the link between employers and employee. In this type of I.R approach the unions are encouraged as a unifying force and to make workers understand the policies – from a different position. The work becomes easier if unions are working with spirit of development and understanding.

In this type of industrial Relation approach unions are having upper hand. Sometimes they make workers as pawn. Only workers interest is put on the front, for getting the status of employers. Pressure tactics are adopted, sometime leading to strike to extract maximum from employer, this attitudes which may push towards terror tactics may not yield desired results.. An unwanted situation. Similarly the employers roaming with a 'lock' in his hand also will not contribute for better relations.

**Industrial Relations in India:** Industrial Relations has undergone a wide change in Indian scenario, during the end of British period in India an awakening in working class was seen. 1. The world wars forced the employers to become friendlier with the workers, to see uninterrupted production is ensured during war time. Out of their self- interest they have to become benevolent, at the same time leaders also came up, Mr. Roy Tilak Mahatma Gandhi and others were instrumental to organize workers union, and also force government to frame labour laws, to improve the lot of workers. In 1929 Industrial dispute Act was enacted later in 1947 it became industrial dispute, act where in machineries to solve industrial dispute were indicated.

**The Directive principles of state policy** our constitution stipulate that the state should endeavor to improve the workers conditions, working conditions, and also productivity of industries which will improve wealth of nations. Several acts are enacted by parliament both before and after independence which were focusing on workers interests, welfare health etc. The 'Tric Act' Factory Act., Industrial Dispute Act, Trade union Act gives major direction to achieve the constitutional directives. Besides this, wages Act 1948, Bonus Act 1965, Gratuity Act 1972, Equal remuneration Act 1975, are some of the acts in the above direction. In 1972 National commission on labour, recommended setting up a permanent industrial Relations commission this was not well received by government. National conference in 1982 made several recommendations Emphasis on formation of permanent industrial Relations commission stringent action on contravention of a mutually agreed code of conduct. This did not find well with unions but unions have arranged for deduction of their subscription through employers pay counter to some extent the check of system is working. Causes of industrial unrest in India can be classified mainly under flour heads they are

**Financial Aspects** Demand for increase of wages, salaries and other perks. Workers demand goes on increasing with the increase in cost of living. Demand for more perks, and fringe benefits. Issue of bonus also has become a contentious one, even though Bonus Act has come fixing minimum rate payable as 81/3% of their total salary in spite of profit or loss incurred by the industry. Incentives festivals allowances, concessions etc. requires a hike every now and then, workers compare these benefits with other industries and demand them without comparing the capacity of the industry where they are working.

**Non-financial aspects** working hours, rest hours, traveling hours are source of disputes. If houses are provided some section of workers want to include travel time also as working hours. Introduction of machines, computers modernization, and automation – In effect any act of management which may result in economy in man power is resisted. More facilities like free meals, free group travel are sought every now and then

### **Government and political pressures**

Industrial unions frequently switch allegiance to political unions in power, which leads to instability. A close example of a politician influencing a workers' organization is Nalco, which was taken over by Starlight. The state government encouraged a strike against Nalco in Chhattisgarh state for several months, which caused the industry to completely shut down for a while. Unions and employees occasionally go on strike against government and private sector mergers, acquisitions, takeovers, and disinvestment policies.

### **Consequence of strained Industrial relations**

Could lead to lockout, strike, go slow tactics, etc. Industrial productivity and output could be impacted, and industry expansion will be slow. could lead to a hostile environment and a worsening of the law and order situation. Mutual faith and team spirit will disappear, which will have an impact on employer, management, and labor relations. Bargaining plot formats, participation forums, and mutual cooperation are all impacted the government will also lose money and might have to spend more to maintain law and order in sector. The sequence of national income and per-capita income will cause workers to suffer more and lose their earnings. The industries will also be negatively impacted, and this is a loss for regular customers as well. Industrial conflict manifests itself in the form of layoffs, retrenchments, lockouts, and strikes. We must understand how these weapons are used by both employers and employees in order to maintain positive labor relations. India's legislators have passed laws pertaining to these conflicts.

### **Conclusion**

The study concludes that technological change has profoundly reshaped India's industrial landscape - enhancing production processes, raising productivity, and transforming the dynamics of industrial relations. The integration of automation, digital tools, and advanced manufacturing techniques has improved efficiency, quality, and global competitiveness. Industries that adopted technology proactively have achieved higher growth and operational sustainability. At the same time, the shift toward modernization has redefined the employer-employee relationship. The traditional model of long-term job security and collective bargaining is giving way to performance-based systems, contractual employment, and skill-oriented work cultures. While these changes promote efficiency, they also raise concerns about employment stability and the weakening of traditional trade unions. To ensure that technological progress leads to inclusive and sustainable growth, industrial relations management must adapt through collaboration, continuous skill development, and proactive labour policies. A balanced approach where technology serves both productivity goals and human welfare will be key to maintaining industrial harmony. Ultimately, the future of India's industrial relations will depend on how effectively management, workers, and policymakers align technological advancement with equitable labour practices and social justice. **Improved industrial relations through dialogue, skill enhancement, and modern labour codes directly foster productivity growth and industrial harmony."**

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