

ARE ORGANISATIONAL SIZE AND EFFICIENCY ENGAGED?

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ABSTRACT

Firm size is relevant in discussions on competition policy, integration, market structure and size. And undeveloped countries differ from developed countries in being relatively more dependent on technology imports and foreign competition, hence results from large countries may not hold.

In the other hand, small firms, say the others, advantages are more related to entrepreneurial dynamism, internal flexibility, responsiveness to changing circumstances and specialized expertise¹, which contribute to higher innovation efficiency in skill-intensive sectors enjoying rapid technological development. And Audretsch (1995, p.178) saw small enterprises be the engine of innovative activity in certain industries, despite an obvious lack of formal R&D activities.

Geoffrey West (2007) showed evidence from the US, those small firms to be less likely to patent than large firms. In contrast, in related areas, such as biotechnology, pharmaceuticals, etc., so called serial innovators, with an accumulated portfolio of technologically important and scientifically linked patents, were more likely to be small than large firms (CHI Research, 2003).

Organization and efficiency, together, remind us, frequently, a factory surrounded by a high brick wall and manned by a force of people working in eight hours shifts. And, of course, in this wisdom we are afraid that in an effort to increase the efficiency, the freedom of working out the innovation in its own way, and at its own convenience will be curtailed.

Red tape is not confined exclusively to the business of the government, but may be found entangling the work and impeding progress in any large organization. It is safe to say that the greatest difficulties which the average innovator has to overcome are not involved in his task itself, but are those thrown in his way by man-made organizations. Usually these obstacles are constructed in the name of efficiency and by those who are employed to assist, not to obstruct.

The danger in any organization of innovation & change lies in the tendency to submerge the individuality of the worker. In such organization it is not dealing with machines, or with piece workers. In innovation & change the unit of the organization is a developed human mind. The product which this organization turns out is the result of the thought of the workers, and just so far as the organization inhibits or distracts these minds from their true course is inefficient. On the other hand, the organization promotes efficiency so far as it tends to permit and to stimulate originality and

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freedom of thought in any worker, and at the same time to coordinate and concentrate the activities of the several workers on the problem on hand.

Many processes which work well in small scale develop defects when tried on a large scale, and vice versa. Many methods of real value have never gotten beyond his scale, because there was no one with sufficient interest, or technical knowledge to adapt the process to the new scale. Thus there is a great economic loss which can be overcome by proper organization.

We believe there is not sufficient support to the thesis about the advantage of larger than small firms. And we remembered the words of Illya Prigogine (1997): *“The little groups can give changes to society as a hole. Minorities had show remarkable power in the past. Thinking the change only succeed by majorities is wrong. It’s wrong to think that conscious is determined by economic and social structures, and they are here now and ever. What will be tomorrow could be totally different from today”*.

Keywords: size – efficiency – innovation - small firms - large firms.

INTRODUCTION



Firm size is relevant in discussions on competition policy, integration, market structure and size. And undeveloped countries differ from developed countries in being relatively more dependent on technology imports and foreign competition, hence results from large countries may not hold.

Schumpeter hypothesis assumes larger firms to enjoy better access to knowledge-producing inputs and be more able to be innovative and improve their productivity. Evidence in favour of this hypothesis have been found by many researchers (see Berghäll, 2006, for the authors), rather the opposite also be found for others (e. g. Baldwin, 1995; Roca Sagalés and Sala Lorda, 2005; Johnson, 2006).

Pagano and Schivardi (2003) found a positive relationship between firm size and growth and explained it with R&D intensity, suggesting that larger size fosters productivity growth because it allows firms to take advantage of all the increasing returns associated with R&D, and that the causality runs from firm size to growth. And argue the full exploitation of innovation benefits from the presence of large firms, though small firms play an important role by experimenting and introduce new products. Large firms are more crucial in the development phase; by accelerate the diffusion and commercialization of new ideas and maximizing their impact on productivity.

Also, the mentioned researches on firm size suggested a more permanent combination with different roles assigned, with small firms being central to

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innovation and technological diffusion, while large firms reap scale economies and high returns on R&D.

In the other hand, small firms, say the others, advantages are more related to entrepreneurial dynamism, internal flexibility, responsiveness to changing circumstances and specialized expertise², which contribute to higher innovation efficiency in skill-intensive sectors enjoying rapid technological development. And Audretsch (1995, p.178) saw small enterprises be the engine of innovative activity in certain industries, despite an obvious lack of formal R&D activities.

Geoffrey West (2007) showed evidence from the US, those small firms to be less likely to patent than large firms. In contrast, in related areas, such as biotechnology, pharmaceuticals, etc., so called serial innovators, with an accumulated portfolio of technologically important and scientifically linked patents, were more likely to be small than large firms (CHI Research, 2003).

The work of West, Brown and Enquist, in biological issues, wrestled with the idea that the scaling laws may be related to the structure and hydrodynamics of the networks that supply nutrients to the cells in an animal's body. After a year of intense activity, the trio discovered that scaling results from the fractal-like structure of the network. They came up with three fiendishly simple universal postulates, grounded in the principle of natural selection, from which the scaling laws can be deduced mathematically. The first of these was that the network fills the whole of an organism's body. The second was that the diameter of the smallest branches in the network does not vary from one species to another since cell size is about the same in all species. And the third was that fluid flows throughout the network with minimum energy loss (Cartlidge, 2001).

Then West and al translate their law to cities or companies, believes size matters. West writes: *“Although we can’t yet predict how specific cities or companies will evolve, we’ve found general mathematical relationships between population size, innovation, and wealth creation that may have important implications for growth strategy in organizations. ... Social organizations, like biological organisms, consume energy and resources, depend on networks for the flow of information and materials, and produce artifacts and waste. So it would not be surprising if they obeyed scaling laws governing their growth and evolution. Such laws would suggest that New York, Santa Fe, New Delhi, and ancient Rome are scaled versions of one another in fundamental ways—as, potentially, are Microsoft, Caterpillar, Tesco, and Pan Am. To discover these scaling laws, Luís Bettancourt at Los Alamos National Laboratory, José Lobo at Arizona State University, Dirk Helbing at TU Dresden, and I gathered data across many urban systems in different countries and at different times, addressing a wide range of characteristics including energy consumption, economic activity, demographics, infrastructure, intellectual innovation, employment of 'supercreative' people, and patterns of human behavior such as crime rates and rates of disease spread. ... To our surprise, a new scaling phenomenon appeared when we examined quantities that are essentially social in nature and have no simple analogue in biology—those associated with innovation and wealth creation. ... A doubling of population is accompanied by more than a doubling of creative and economic output. We call this phenomenon 'superlinear' scaling: by almost any measure, the larger a city's population, the greater the innovation and wealth creation per person. ... The social and structural similarities between cities and firms suggest that our conclusions extend to companies and industries. If so, the existence of superlinear*

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scaling that links size and creative output has two important consequences: First, it challenges the conventional wisdom that smaller innovation functions are more inventive, and perhaps explains why few organizations have ever matched the creativity of a giant like Bell Labs in its heyday. Second, it shows that because organizations and industries must apparently innovate at a continually accelerating rate to avoid stagnation, economizing by reflexively cutting R&D budgets and creative staffs may be a dangerous strategy over the long term.” (HBR, 2007).

Many other researchers conclude the opposite. There is only one answer? We think not. Our first argue is about the translation from biology to social systems. As Capra (2007) say: “...a social system is not the same as an individual organism. So it is a living system, but it's not an organism.(...)Biological networks operate in the realm of matter; social networks operate in the realm of meaning. Both produce material structure and social networks also produce the nonmaterial characteristics of culture-values, rules of behaviour, shared knowledge, etc.”

And there are other important differences. Capra continues to write: “Biological networks produce and sustain a material boundary, which imposes constraints on the chemistry that takes place inside it. Social networks produce and sustain a nonmaterial, cultural boundary, which imposes constraints on the behaviour of its members”.

INNOVATION AND EFFICIENCY IN ORGANIZATION



Productivity growth, innovation and technological change are very important to maintaining competitiveness in a global economy. In developed countries, large amounts are invested in R&D, supported by publicly financed share (Berghäll, 2006). The effectiveness of technological policy varies greatly from countries and firms. As Berghäll say, SMEs are most eligible for public R&D support, with the assumption they are more likely to suffer from financial constraints³, while support granted to large firms generally attracts a great deal of criticism. Support granted to large firms can also be perceived to interfere with the creative destruction process.

Efficiency is a word associated with a systematized effort to increase the output of machines and manual labor. From this it has come to associate efficiency with stopwatch studies, close supervision, time cards, and detailed reports. And sometimes the word organization is associated with supervision, administrative duties, with everything that is the antithesis of the freedom of thought and action assumed to be essential to real innovation.

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Red tape is not confined exclusively to the business of the government, but may be found entangling the work and impeding progress in any large organization. It is safe to say that the greatest difficulties which the average innovator has to overcome are not involved in his task itself, but are those thrown in his way by man-made organizations. Usually these obstacles are constructed in the name of efficiency and by those who are employed to assist, not to obstruct.

Many of the complications of organization have resulted from the application of the fallacy that efficiency and economy can be promoted by the consolidation of small units into larger ones. As the organization grows the worker becomes further removed from the source of authority, the paths through which the business of the organization must pass become devious and full of obstacles, and the hands of the worker become tied by regulations and precedents. The economy of consolidation is also more frequently apparent than real. For example, if the function of a unit is merely to distribute something at the least possible expense, no doubt this end could be best accomplished in a centralized unit, but it is better to appear extravagant by spending money for branch units than to have a some force work for weeks or months on a problem because, through difficulty in getting that thing, they are ignorant of the fact that the problem have been solved.

One of the windmills against which the organizers most frequently tilt is the duplication of work. It is easy to see that in certain types of work duplication does become a great evil, but; for example, in research work it is not duplication but the lack of duplication that is to be avoided. Few investigations lead to wholly correct conclusions and new results become established as facts only when they are confirmed by several workers.

The money with which the worker's salary is paid, and his equipment purchased, may have been provided for the solution of a problem, and it does not seem unreasonable to expect him to stick to this last. The particular method by which he attempts to solve the problem is another question. Some men are successful only because, throughout their career, a skilful pilot has held them to the course.

The efficiency of existing organizations is to be increased by coordination and consolidation. One problem of organization is continually with the worker whether he welcomes it or not. No factory is so small to avoid it. When a man becomes an assistant he faces an organization problem and his is, perhaps, the more difficult one because he lacks the authority to put his ideas into effect.

In building up an organization there are certain obvious ends to be gained and certain obvious evils to be avoided. It perfects the organization to obtain efficiency. It have a program of work planned, a particular end to attain, and the money available should be so expended that it carry it the greatest possible distance on the road to that end. Of even great importance is the necessity of expending the energy and ability of the workers so that they will yield the greatest returns.

The danger in any organization of innovation & change lies in the tendency to submerge the individuality of the worker. In such organization it is not dealing with machines, or with pieces workers. In innovation & change the unit of the organization is a developed human mind. The product which this organization turns out is the result

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of the thought of the workers, and just so far as the organization inhibits or distracts these minds from their true course is inefficient. On the other hand, the organization promotes efficiency so far as it tends to permit and to stimulate originality and freedom of thought in any worker, and at the same time to coordinate and concentrate the activities of the several workers on the problem on hand.

In considering means of attaining this end it must keep in mind the distinction between the methods of the factory efficiency and those which must prevail in innovation & change. In the factory the road to efficiency leads through system, routine, supervision, coordination of men and machine, office records and elimination of unnecessary motions. In the innovation & change case, efficiency is obtained by reduced supervision to the lowest point compatible with the ability of the worker; by removing him from the distractions of routine work; by surrounding him with an atmosphere conducive; by providing him with the special tools necessary to obtain the ends, and by promoting a spirit of collaboration which unite the individual men into a compact body working together.

However, in building that organization on the individual worker it must keep in mind that there are diverse kinds and condition of men. Innovators and entrepreneurs may be divided into two classes, the leaders and the followers. Permit us to put an example of the history of Argentina in nineteenth century: Fontana and his explorers who blazed the way through the mountains and the pathless forest into the Andes valleys made a great Patagonia possible, but without the settlers who followed in their footsteps and turned the wilderness into productive farms and cities their effort would have been valueless and forgotten.

The leaders and entrepreneurs are the exceptional men, with imagination, who have the faculty of grasping the significance of something that to the ordinary worker seem trivial or incomprehensible, and who, by a series of brilliant planned steps, push the future. For a man of this type, the organization must afford with latitude in the selection of matters and in the method to try them. On the other hand, there are many men who, if left to the dictates of their own imagination, flit from one unfinished project to another and accomplish little beyond their own entertainment, while they may, under the right leadership, become good workers. For these men a more rigid system is necessary. For the great majority of innovators & entrepreneurs, perseverance and logical thinking all that is necessary is the essential equipment and an opportunity to develop their ideas.

In developing an organization consideration must also be given to the type of work to be done, although the underlying principles apply to all cases. A big difference is in the primary object to be gained. The organization and methods of work will necessarily be along different lines. And it is very easy to make diagrams on paper showing how, in a logical way, this should be done, but diagrams, no matter how well be done, cannot really represent human beings. Whatever type of organization is chosen, the executive functions will be center about the administrative head of the firm. The head of an innovative organization, or small enterprise, must be, not a chief but a leader. His function is not so much to direct the change as to recruit a staff; to provide the necessary equipment and material, to maintain an atmosphere conducive to constant application, and to coordinate the work. The members of the staff are his associates, not his assistants.

The form of larger organization which has been most used in the past follows the lines of departmentalization. It necessitates arrangement for cooperation between

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departments on any problem involving more than one, something which is very easy to show in a diagram, but very difficult to obtain in practice. This system has the advantage of making it possible for the work in each branch of the enterprise, but carried to its logical end establishes artificial barriers which impede progress.

The organization around the process becomes then a question of fitting the arrangement to the workers available, deciding each case on the basis of its own peculiar conditions. It is entirely possible to obtain in one process harmonious and efficient work with the various sub-process organized in different ways; in one with workers of more or less independence of action responsible to a leader who is in turn responsible to the chief; in others with independent workers cooperating and each responsible to the chief for his part.

A military chief in planning a campaign provides means of transportation, and lines of communication to keep his troops supplied with ammunition. This branch of the service is secondary, but of the most vital importance. If it fails the campaign fails. Its function is to get ammunition to the fighting troops in sufficient quantities and at the time it is needed. The color of the trucks in which is brought is of less importance. It is of little comfort after the battle is lost for wants of shells to know that the records of the division are complete and accurate.

The clerical force of a innovative organization performs a similar function. Its function is not to establish channels through which the business of the unit must go regardless of consequences, but to provide ways of getting the ammunition to the front when it is needed. The official that has a blind adherence to records and regulation to obscure this end has outlived its usefulness.

The method of administering this service is a difficult one to arrange satisfactorily. The former method would seem to offer large opportunity for the exaggerated idea of the importance and authority which is the great evil of the service branches – the latter should enable the chief to make the clerical force what it should be, a servant to the process.

What has been said of the clerical force applies also to the IT, except that with few exceptions the IT people appreciate their relation to the process staff and any failure to function properly is usually due to faulty organization rather than to lack of inclination to be of assistance. The contact between the staff and IT people must necessarily be a close one. Nothing is more essential to efficiency that ready access to information. Data organization is not clerical work, but requires special training, knowledge of matter, and above all a wide acquaintance with business questions.

A third auxiliary branch which should not be overlooked is the mechanical shop. There are process whose time is more valuable than that of mechanics and it is not economy to allow work to wait for special apparatus or repairs. In a small enterprise the shop may be only a well equipped work bench; in some others the shop is really part of the unit, and should be complete and adequately manned. A week rarely passes in a enterprise that some small construction or repair job does no arise. The mechanical branch should be available to rake care of this work without unreasonable delay.

Some entrepreneurs do not continue their innovation works when they reach the applied stage because their tastes lead them to new paths in unexplored fields. In other cases the necessary equipment may not be available, or the branch of human activity to which the goods may apply not at hand.

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The efficiency of many processes would be greatly increased if definite provisions could be made for carrying works to real completion without unnecessary delay.

Many processes which work well in small scale develop defects when tried on a large scale, and vice versa. Many methods of real value have never gotten beyond his scale, because there was no one with sufficient interest, or technical knowledge to adapt the process to the new scale. Thus there is a great economic loss which can be overcome by proper organization.

And, finally, to complete the work it is necessary to carry the goods to that part of the customers which is directly concerned. If it is something which affects established uses it is very difficult. The inertia of public cannot be overcome so easily.

If we should attempt to summarize these rambling observations in one sentence we would say that in promoting efficiency in innovation work, the essential thing is not the form and size of the organization, but rather the spirit in which it is applied. The organization should be like a roadway over which the innovative idea passes, not a structure in which is confined.

John A. Wheeler, who passed few months ago, says: *“And as the surface of the planet becomes more and more densely covered with its human population, it become increasingly necessary to retain portions of it in a wild state, i. e., free from the organizing mania of men, as national and city parks or reservations to which we can escape during our holidays from the administrators, organizers and efficiency experts and everything they stand for, and return, to a nature that really understand the business of organization”*.

Perhaps we can show a more apt illustration than Wheeler realized. The parks to which he was escape to allow his primordial instincts free play are possible only through an efficient organization. The forest through which he roamed unhindered had been saved from commercial exploitation by this organization; a fire warden in some isolated lookout station is watching for the first sign of the conflagration which his primitive instinct may had started, and a carefully organized and equipped fire-fighting force was waiting for the phone message saying that its services are needed at a certain spot; this organization stocks the streams with fish, protects the game, and constructs roads over which he could flee from the dreaded organizer; in short, it makes it possible to escape, as he expressed it, “from the organized routine of our existence”.

That conception of a park fits so well with our idea of a properly organized enterprise that we can say with Gratiano⁴, *“I thank thee for teaching me that world”*.

OUR CONCLUSION

We believe there is not sufficient support to the thesis about the advantage of larger than small firms. And we remembered the words of Illya Prigogine (1997): *“The little groups can give changes to society as a hole. Minorities had show remarkable power in the past. Thinking the change only succeed by majorities is wrong. It’s wrong to think that conscious is determined by economic and social structures, and they are here now and ever. What will be tomorrow could be totally different from today”*.

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NOTES

¹ Of course, there are the opposite (Bishop).

² Of course, there are the opposite (Bishop).

³ The constraints are most imposed by asymmetric information and capital market imperfections.

⁴ A character in Shakespeare's "Merchant of Venice".