

12TH INTERNATIONAL COMMAND AND CONTROL RESEARCH AND  
TECHNOLOGY SYMPOSIUM

"Adapting C2 to the 21st Century"

Information and Knowledge Management as Competitive Advantage Sources  
in Information Age

- Organizational Interoperability;
- Knowledge-centric organizations vs. knowledge-based organizations;
- Self-synchronized organizations.

Organizational Issues

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## **Abstract**

Information and knowledge assume an increasingly important role in organizations performance. In the so-called information age there's an emerging tendency to seek and develop new tools that allow organizations to reach and keep a competitive advantage. Competitive Intelligence is seen as a possible answer to this problem but, as can be proved, its simple implementation can not be seen as a global solution. There are other options that require innovative solutions and motivate the organization, itself, to change its structure and attitude concerning the surrounding fields of interest, where it operates.

The competitive environment where information age organizations operate became more tumultuous and very dynamic. Information, and knowledge that can be generated from it, became essential resources for all organizational activities. Management processes try to follow and shape the internal and external environments tendencies which lead decision makers in the right way. Effective management procedures used today may lead, in a few months time, to ruinous decisions. Concerned with this situation, organizations should adapt fast to their operating environments, develop adequate methods and techniques that allow them to decide and act in a timely manner in order to survive in the marketplace or even in a battlefield.

## **Key Words**

Information Management; Knowledge Management; Competitive Intelligence; Self-synchronization.

## **INTRODUCTION**

In a globalized world, markets can be seen as competitive and complex environments, where organizations' cooperative relations both at internal and external levels may become a powerful weapon against competitors and adversaries. These relations can only be better performed if the organization is capable of setting up a cooperative network, change its internal structure, adopt communication's standards and learn how to build situation awareness and situation understanding based on information and knowledge sharing. Beyond

the establishment of cooperative relations, it's also necessary to learn how to work in groups and networks which implies the development of the necessary flexibility to faster respond according to new environmental conditions and relationships.

Synchronized actions can be foster if organizations are able to coordinate all their resources in an effective way. The finest coordination capability, able to respond to the most critical situations, can only be achieved in organizations where all its members regularly attend professional training and education sessions, that clearly define their business strategy, that share high quality information and follow a trust policy among all their members. Additionally, organizations' business processes may also be affected at a global level by international events and Information warfare activities. Everyday, alert systems are developed and optimized, trying to anticipate the effects of those events and trying to identify possible emergent risks and opportunities. Simultaneously, information analysis processes and protection mechanisms are also created and implemented.

Within this context, success can only be envisaged by organizations that are able to implement measures that can give them competitive advantage over others. This paper intends to identify what kind of tools and methods have been developed by commercial and military organizations and the way they should be used to generate competitive advantage in the information domain.

## **1. INFORMATION AND KNOWLEDGE MANAGEMENT**

The information amount, produced and manipulated by organizations, is so high that it is vital to understand the way it flows, where it is needed, who needs it and how it is used and transmitted within an organization. Therefore, it is necessary to design and implement models that are able to capture and to represent all the existing information flows across an organization's structure.

In this way, information flows, networks maps and different technologies applications must be created. The first, built for all business processes, allow decision makers to coordinate, in a better way, their information needs and to carry out strategic planning with enhanced effectiveness. The use of this kind of "maps" can reveal useful information, available inside the organization, which is not currently used in the most advantageous way. If, in one hand, it is essential

to record all the available information, on the other hand, it is also important to know how it circulates and which are the relevant information flows dependencies generated.

Communications and networks maps may provide accurate answers to these questions. Technology maps could also provide information on all the technological means/resources implemented within the organization and show a precise picture, which allow managers to realize the implications imposed by technological limitations and also the opportunities powered by technology upgrades or new IT developments. Information collected from this kind of records allows the detection of potential bottlenecks in an organization's information flows. In addition, it is also possible to identify critical information resources which are necessary to transmit and the available systems and means to convey it. Table 1 depicts a possible way of representing the information provided by the above mentioned maps in a military unit. In this example we can identify a bottleneck detected in the second line of the matrix (blue square) – network resources flows almost consume the entire system's capability. In some circumstances, information flows convergence in one single actor may also cause disorder in information flow (red square), which can be also seen as a different kind of bottleneck as important as the previous one and with enough power to affect all the system's effectiveness.

INFO Actor (Source)	INFO Actor (Destination)	Network Resources Used (%)	Information type delivered	Amount of INFO delivered	Observations
Chief of Staff	Force Commander General	77	Enemy Reserve Activities	50 Mb	Daily
Platoon Leader	Squad leader	98	Enemy location	1 Mb	Permanent
Platoon Sergeant	Squad leader	37	Ammunition supply	800 Kb	29SMC4368
...	...	...	...	...	...

Table 1 - Information flows matrix in a military unit.

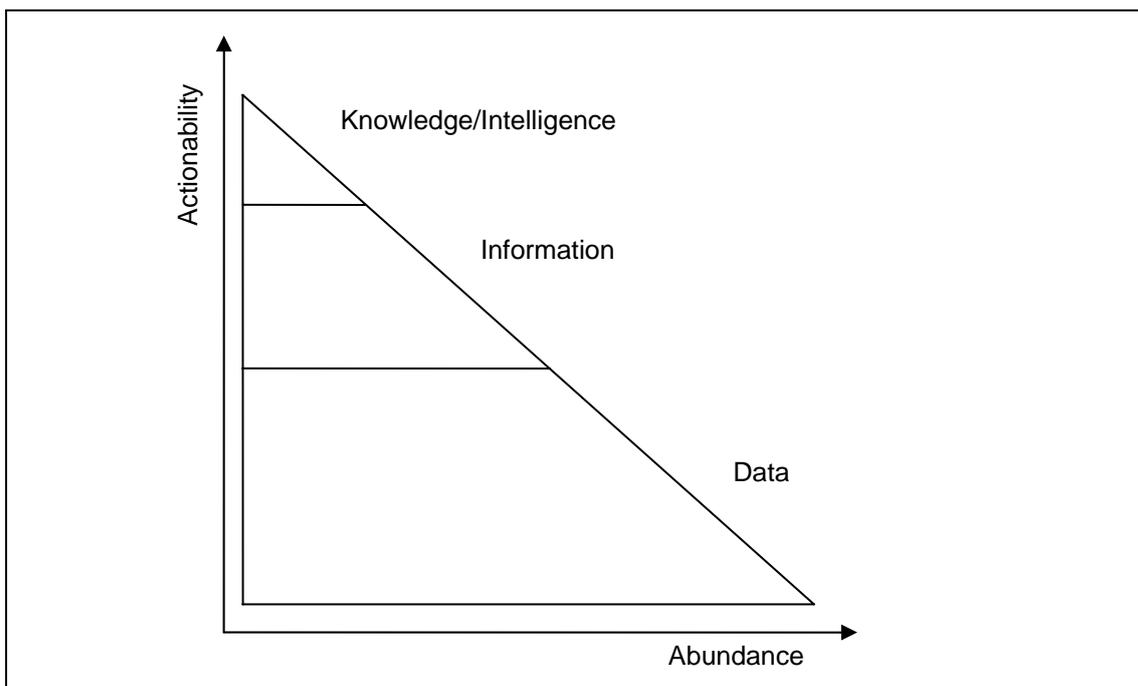
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Additionally to their internal process framework, modern organizations must have international concerns. More than ever, global events can affect regional and local marketplaces and consequently influence an organization's strategy. As the need for global information resources increases, more it's necessary to consider global information integration and management solutions in order to increase its value.

The rules of competition are being changed by telecommunications and information. Management of information resources, knowledge, and of the changes to implement is essential for the survival of an organization. Knowledge is a vital resource that daily increases in value. In the so-called Knowledge Society, this resource matches in significance other traditional resources such as: economical, geographical and financial assets. Organizations must strongly invest in professional qualification and adopt modern management techniques focused on product and processes innovation. These measures will enhance technology and knowledge exchange, increasing organizational effectiveness. Likewise, it is also necessary to create a network able to support a large number of decision making processes, and knowledge production, capture and inclusion operations at the hierarchical lower levels of the organization. In order to correctly perform all these actions, in a synchronized manner and according to the organization's interests, the network must be capable of conveying to all its users the approved strategy. Top level managers must be able to communicate with lower organizational' levels so that decisions can be taken in harmony, and in a perfectly consistent and transversal way. Creative initiatives must be stimulated in every individual at all hierarchical level and they must be stimulated as often as possible to apply for on-job continuous education. In this way, a privileged environment for knowledge sharing is created, but it isn't enough. In order to create new knowledge, organizations must explore its key competencies, test new solutions, learn from the surrounding environments and always search for new challenges, embracing management processes that generate effective solutions both at individual and collective levels. Organizations shouldn't adopt repetitive business processes and can not believe that something that works is not supposed to be changed. They shouldn't feel uncomfortable with innovation, since it must be an integral part of its daily activities. Only then it will be possible to generate knowledge. For instance, if a driver goes from home to work and

back, using always the same road (because he is afraid to try a different one and get lost), he will never know about other roads. One day if there is an accident in his traditional route he will panic and certainly come late to work.

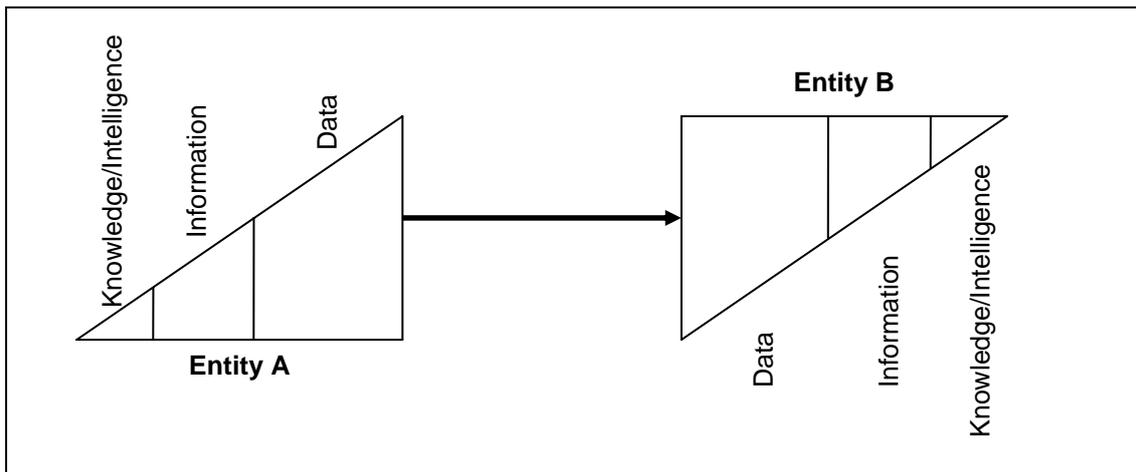
Knowledge management must be able to deliver cooperative information and transmit the best practices. It must allow identification of organization's knowledge assets and become itself a new knowledge production tool, generating a competitive advantage. To enable this process, leaders must understand how knowledge flows through the organization. Figure 1 shows data, information and knowledge according to its abundance and actionability. As it can be seen, data can be found in large quantities with less related information available and even fewer related knowledge. But, the organization's ability to take the appropriate decision/action (Actionability) increases at the top of the triangle.



Source: Adapted from Nissen (2002, p. 253)

Figure 1 - Knowledge Hierarchy Triangle.

To clarify this concept is important to understand not only how knowledge flows through the organization but also what conditions may affect its transmission. It is possible to establish a transmission model to explain how knowledge transfers among people. Figure 2 represents the knowledge transfer model. Entity A uses its knowledge to produce information which will be transformed into data for delivery.



Source: Adapted from Nissen (2002, p. 254)

Figure 2 - Knowledge Flow Directionality.

On the opposite side, the receiver (Entity B) will collect the data and, according to the context, will transform it into information. The information produced will be later used for action and/or decision, becoming therefore knowledge.

The process will run without any problems until new data be received by Entity B. This is a critical point, when the receiver transforms data into information. The context must be the same in order to produce the same information and achieved the related knowledge. Entity B must be able to run the process in the opposite direction. In case of impossibility, knowledge will not flow among them.

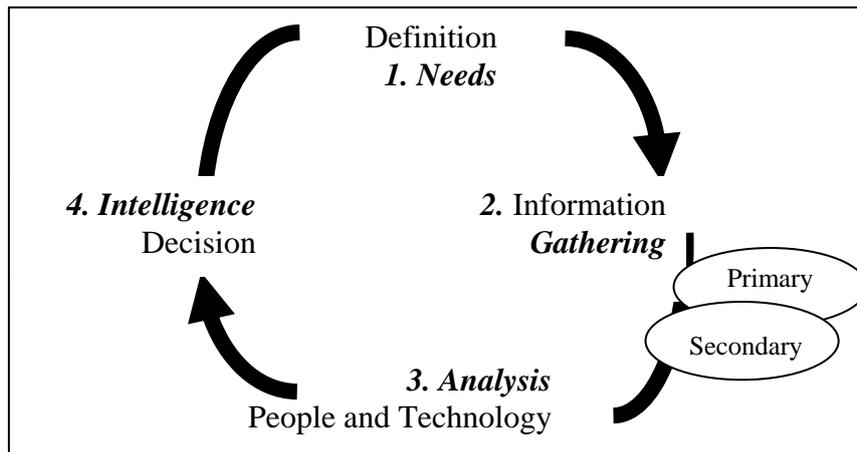
## 2. COMPETITIVE INTELLIGENCE – COMPETITIVE ADVANTAGE SOURCE

An effective information and knowledge management doesn't necessary generate a competitive performance. An organization may have the know-how and specialized human resources, may also have large years of experience in its business field and know all marketplace tendencies but if it is unable to know what its competitors are doing, and can't t predict different solutions for different possible outcomes, that may occur, it won't be able to survive in a competitive business area. The environment, in which organizations operate, is very dynamic and the impact of specific events can be disastrous. The margin for errors is becoming smaller and smaller. Therefore it is mandatory to create an alert & analysis system focused on the support of manager's decision process that, above all, prevent managers from being surprised with marketplace's new events and their implications.

## **2.1. Competitive Intelligence**

Competitive Intelligence (CI) “is the organization’s attitude that makes it aware, in a continuous way, of all aspects of the surrounding environment, trying to understand and respond to signs coming from it. This response always implies a decision.” (Taborda & Ferreira, 2002, p.12). Decision, within this context, will be more effective if the competitive intelligence process product’s quality is high and if it is taken into consideration at the correct time, since good decisions can only be made at the proper time.

Precision of the overall competitive intelligence process products can only be assured if a systematic methodology is implemented and put into practice at all levels. Thus, as it’s illustrated in Figure 3, competitive intelligence starts to identify the type of information the manager needs to know in order to take a specific decision, or a set of decisions, and establishes its correct timeliness. At this stage, it is vital to precisely define all the information needs of the decision-maker in order to assure, at the end of the process, a correct answer to all the questions initially raised. The second stage consists of rumour clearing up and in information gathering about events occurring in the organization’s surrounding environment. The gathering phase must include all available sources: people (primary sources) and electronic and printed sources (secondary sources). The next step involves analysis and information interpretation resulting in contextualized information. This is the most critical stage of the whole process where failures at the competitive intelligence process generally occur, mainly because analysts are unable to apply a coherent methodology. This situation may be originated by a lack of analysts or from the fact that some of them may just write something, without any specific value, in which are neither identified the event’s implications nor suggested possible recommendations. The last but certainly not the least important stage of the cycle comprises the dissemination of analysis results (intelligence). Recommendations must be made available to the decision maker, at the right momentum, in order to be taken into consideration when the decision is taken. At this point, the decision maker is able to decide and act in accordance to the situation - he has the knowledge to do so.



Source: Taborda and Ferreira (2002, p.36)

Figure 3 – Competitive Intelligence Cycle.

In our days, everyone can easily have access to information. Information is distributed and made available by several open sources. Individuals only need to make a simple web search (in Google, for instance), to be flooded by information of all kinds. The key to an efficient search is selecting the information that really matters and afterwards to promote its processing in order to concur to a better decision making support. Therefore, Competitive intelligence activity involves information research and exchange in a systematic and transversal way. The process never turns away from the organization's holistic view and always considers the singularities of all organization's sectors. Its main goal is to identify and analyse the risk sources that can affect the business in order to prepare an appropriate response, at the correct timeline. Response' effectiveness to face threats and explore opportunities will be greater if competitors' identification is accurate, and events' analysis is precise. For instance, a client going to bankruptcy, a supplier that becomes the only one capable of providing a specific type of electronic component, have a stronger influence power over other organizations. In addition, effectiveness can also be increased by the ability to understand to whom the information is useful and what type of decisions must be taken if needed.

Competitive intelligence activities have always been associated with industrial espionage and other suspicious activities (with questionable lawfulness), mainly because it deals with secret information most of the times. Some major organizations have used detective agencies to investigate their competitor's activities, some even tried to scan other organizations trash. These methods came to public knowledge and world press as making part of competitive

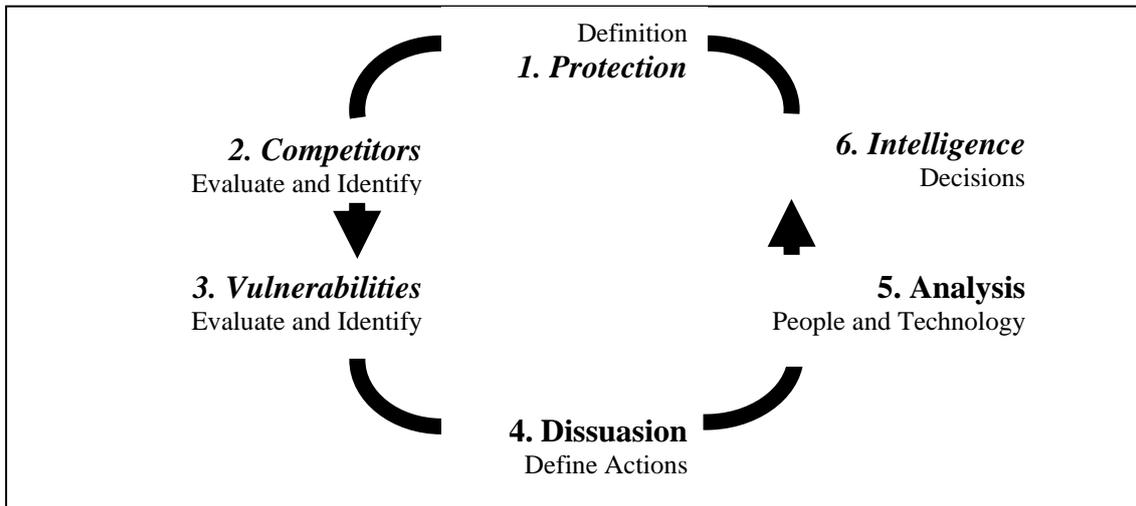
intelligence activities, which is absolutely wrong. The same happens at governmental level. Large number of countries ignores ethical and legal principles in their investigations and information acquisition activities when the State's National Security is at risk. This kind of operations is not competitive intelligence, it is pure espionage. The "red line" and the big difference between these two concepts, is that legal aspects are followed and that a professional ethical code is respected – the code is tutored by the Society of Competitive Intelligence Professionals (SCIP). Therefore it is important to emphasize that, in spite of the competition being very tough, there are rules and legal obligations that impose limits to those that might be tempted to implement and use "dark methods".

## **2.2. Counterintelligence**

If on one hand it is essential to generate intelligence, on the other, it isn't less important to establish which kind of information is critical. Organizations that neglect this subject will end up making the job easy for competitor's CI professionals.

Within this context, simultaneously to CI cycle, organizations must run a counterintelligence cycle that, when perfectly integrated with the first one, will produce high value results by avoiding, sometimes severe damages. According to Taborda and Ferreira (2002), counterintelligence cycle shares the same starting point of CI cycle (contact with the decision maker) and works in the opposite direction, as depicted at Figure 4. At this starting point, the most critical information is identified and the respective protection requirements are defined taking into consideration that it's impossible to protect everything. Information resources to be protected must be the ones that, in competitor's possession, may lead the target organization to a disadvantageous position by revealing important knowledge of its activities and intentions. Counterintelligence cycle's second phase tries to identify competitors that may be interested at the information assets identified at the previous phase. Beyond this identification, it is important to estimate competitors' information assembly and analysis capability – that is to evaluate its competitive intelligence capability. The third phase tries to identify and estimate organization's vulnerabilities, according to competitor's capabilities, and information sensitiveness degree. At this point,

the counterintelligence team must know, exactly, what must be protected in the organization and against whom it should be concerned about. At the fourth phase the actions that must be taken to deny competitor's CI activities are defined. Additionally, it is important to assess its (actions) effectiveness in order to assure that security requirements were implemented. This assessment is done at the fifth phase of the cycle and also enables a deeper knowledge about competitor's information gathering patterns. Finally, it is essential that all counterintelligence cycle products reach the proper destination at a convenient time. It's relevance is similar to competitive intelligence cycle last phase but, in this case, results dissemination are reflected in decisions that will influence the way a specific information will be manipulated within the organization and how it will be protected.



Source: Taborda and Ferreira (2002, p.185)

Figure 4 - Counterintelligence Cycle.

It is also important to state that a counterintelligence action will only produce benefits if all organization members feel “part of the team“ and are aware of the counterintelligence cycle's implications. For that reason it is important to share this vision and stimulate the adoption of a security policy. Organizations must strongly invest in a comprehensive view of its entire counterintelligence program. The idea is to promote the implementation of the necessary measures as simple as possible. Its elements must constantly keep up their attention focused in risks that may affect the organization and events that may have an effect on their professional roles, in case of critical information leak.

### **3. INTEROPERABILITY**

A timely decision is not enough. It is also necessary to be able to perform swift decisions. Gaining a Competitive advantage over competitors is, in some way, related with organization's flexibility which contributes to adapt and to promote systems integration. Flexibility reinforces its capability to establish connections with other organizations, at both national and international levels, according to its interests. This aspect may shape, in one way or another, organizations' structure that tends to create modular substructures that establish cooperation relationships between themselves. Established relations represent assumed commitments that can restrain organization's negotiation power. Therefore, the establishment of those relations must be carefully envisaged and planned. Flexibility, within this context, makes cooperative work possible, increasing the interoperability with others. Modern organizations are facing complex situations that generate the need to share information and stimulate cooperative work in order to find effective solutions. Situations are very volatile and events take place in an extremely fast pace. It is impossible to know who will need a specific piece of information, the exact timing of that need and who will have to work with whom. One first possible solution would be to give the entire organization access permissions to all the available information. A second option would be to establish links and build-up relationships with everyone. The right choice must combine the previous two approaches and integrate a little bit of both. The idea is to create a system that in its initial stage is similar to the first solution and, as it is impossible to know who will need to speak with whom, try to speed-up relation's establishment. The system must be capable of reconfigure the network, in a dynamic way, according to emergency needs. The same must happen with organization's processes that must be reconfigured in order to integrate all the relevant members and empower their role in the organization. It is also important to highlight that interoperability must be built at organization's internal level in order to be, more easily be extended to other actors with whom the organization has been establishing cooperative work relations (e.g. soldiers, reconnaissance units, combat support units, car industries, marketing agencies...).

Interoperability can only be achieved if this is implemented at all levels. At physical level (physical infrastructures of implemented systems), organizations must be connected through a network. Each member (node) must

be able to share information with to all network members and, simultaneously, search, retrieve and understand the meaning of available information (cognitive domain). Additionally network members must also be able to join and participate at cooperative virtual environments (social level). Figure 5 represents the above mentioned interoperability domains were is possible to identify organizations' A, B and C interconnection. The different kinds of links represent interoperating capabilities in a same or through different domains. For instance, organization A may send its local knowledge (understanding about a particular situation) to organization C that collects it in a form of information and applies it in its current cooperative work with organization B. Cooperation takes place at the network and trough a network that delivers data (see Figure 2) to the corresponding users. The network is the infrastructure that allows the establishment of pre-settled connections that, in case of need, speeds up the interconnection of new organizations or new departments of the organization

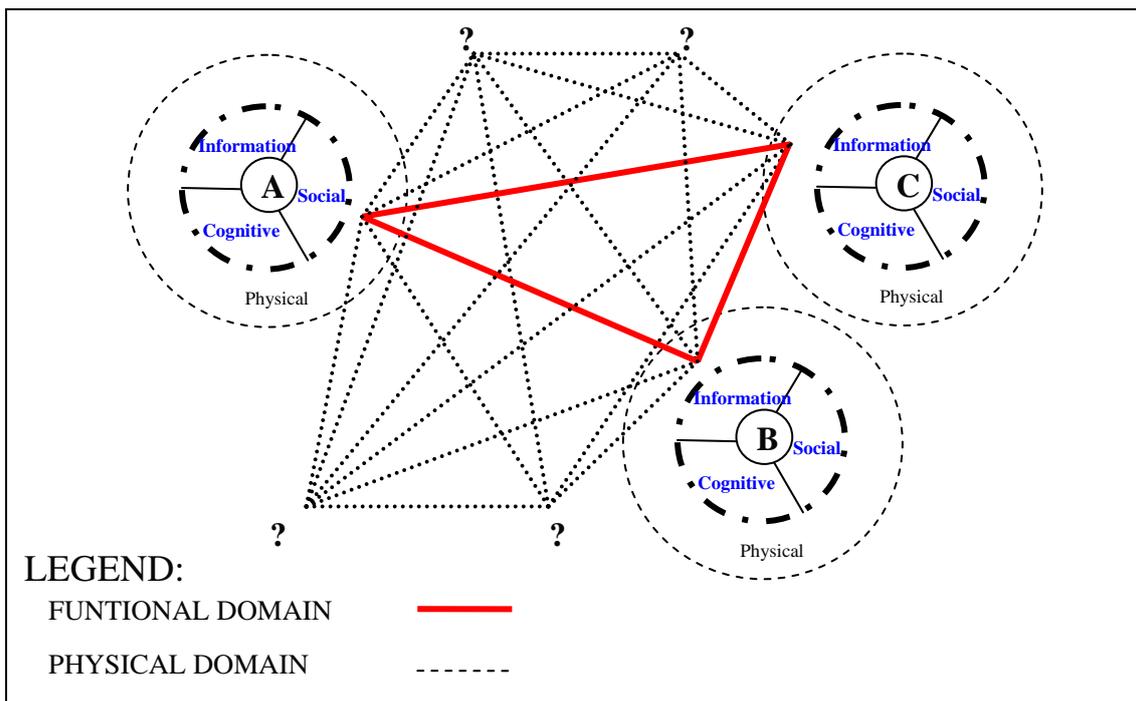


Figure 5 – Interoperability.

Every single organization only needs a network connection to receive information. To understand its meaning correctly, organizations they need, in addition to the network connection, to implement knowledge sharing processes that makes semantic interoperability possible. This is the basis to differentiate applications interoperability from data interoperability. The latter eliminates standard format requirements and can be obtained if all users are aware of all

data types' representation. Data interoperability offers more system flexibility because it can accept and establish relations with different types of organizations. Network users that release information must do it in such a way that the majority of the other users can understand it or, if a proprietary format is used information should be packed with additional data to facilitate its interpretation. In this case, organizations that intend to use its own format must be aware of all the other forms of information representation used by their sources. Like this, it will be possible to keep interoperability between standard systems and other proprietary architectures.

Organizations unable to interoperate, or with serious interoperability limitations, will not gain the right to access to all the available information. In this case, its information provider capability will be very weak, will have difficulties to understand the available information and will not be able to develop cooperative work with other organizations. This inability will inevitably lead to connections disruption from the established network, mainly because the organization is useless to the system and it doesn't increase the system value. Without this capability, shared situation awareness and shared situation understanding can not be established. Relationships between the organization and the system network will be weak and consequently the organization will lose its competitive power against its competitors.

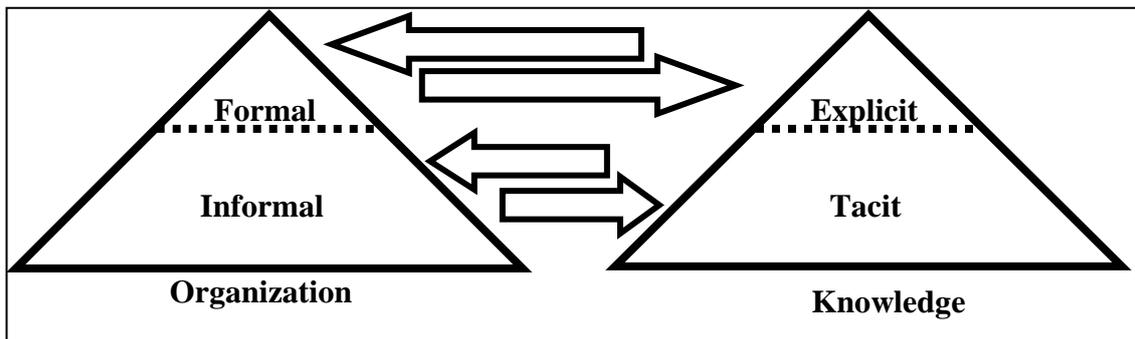
#### **4. KNOWLEDGE-BASED ORGANIZATIONS**

The major role of knowledge on organizations performance has already been mentioned before, but now it's important to specify how organizations should deal with this intangible resource and try to relate it with the preceding concepts.

It is clear that organizations must have the ability to evaluate its surrounding environments and areas of interest in order to anticipate possible undesired outcomes. They must question traditional daily practices and above all organizations must learn how to learn. This apprenticeship involves knowledge production and transmission processes. This, along with the physical and financial assets, generates value in the organization, and for that reason it must be looked at as valuable competitive resource. Organizations must make an effort to maintain a proactive attitude and constantly update their

processes. This task can be very difficult to accomplish because knowledge is inexhaustible and can also be used by competitors. Following this perspective, it is vital that organizations are able to create and preserve methods of optimizing this knowledge.

In a simple way, what it is needed is to enhance human resources competencies, by investing in continuous education, and then converting it into organizational assets (using documented processes and knowledge databases). According to Sousa, Marques, Tavares & Cavaco (2000), knowledge resources and organization's structures can be understood with the help of an "iceberg type" model, as depicted in Figure 6. Organization's formal processes portion corresponds to the iceberg's visible area and the informal processes to the submerged area. This last one supports, influences and commands the first one. The same can be stated of knowledge. The iceberg's visible part corresponds to the explicit knowledge and the invisible one to the tacit knowledge.



Source: Adapted from Sousa et al. (2000, p. 12)

Figure 6 - Organization's and Knowledge Iceberg.

It can be perceived that the weight of tacit knowledge in organizations is very heavy. The explicit knowledge is supported by the tacit knowledge which can only be found in people's minds. Therefore, it is important to constantly support in human resources competencies development and to keep their exclusiveness (inside organization structure) for a convenient period of time, and to develop ways of knowledge socialization, externalization, combination, and internalization. Knowledge flow concept, introduced by Nonaka and Takeuchi (1995), describes knowledge transmission processes. The first one is based on the principle that only individuals can create new knowledge,

therefore, it is tacit by nature. The second one, called externalization, takes tacit knowledge and transforms it into concrete and explicit knowledge. Combination (the third one) involves coordination among different groups and the documentation about different knowledge in order to produce new explicit knowledge. The last one considers the application of combined knowledge to turn it into tacit. Figure 7 tries to relate Nonaka's knowledge flows with Nissen's knowledge flow directionality concept. This figure illustrates how knowledge may flow from entity A to B. If we consider "data" and "information" as the explicit knowledge portion of the triangle and "knowledge" as its tacit part, we may understand, according to Nonaka's model, how knowledge flows from A to B. It is possible to verify that the most difficult operation is socialization – this is the longest process. Assuming that entity A tries to transmit his tacit knowledge to entity B, it must produce related information which, in turn, will be transformed into data enabling in this way the transmission. On the other side, entity B must be able to perform the reverse process. This will only be possible if entities share the same context and have the necessary background (knowledge) that enables knowledge absorption between different entities (A and B).

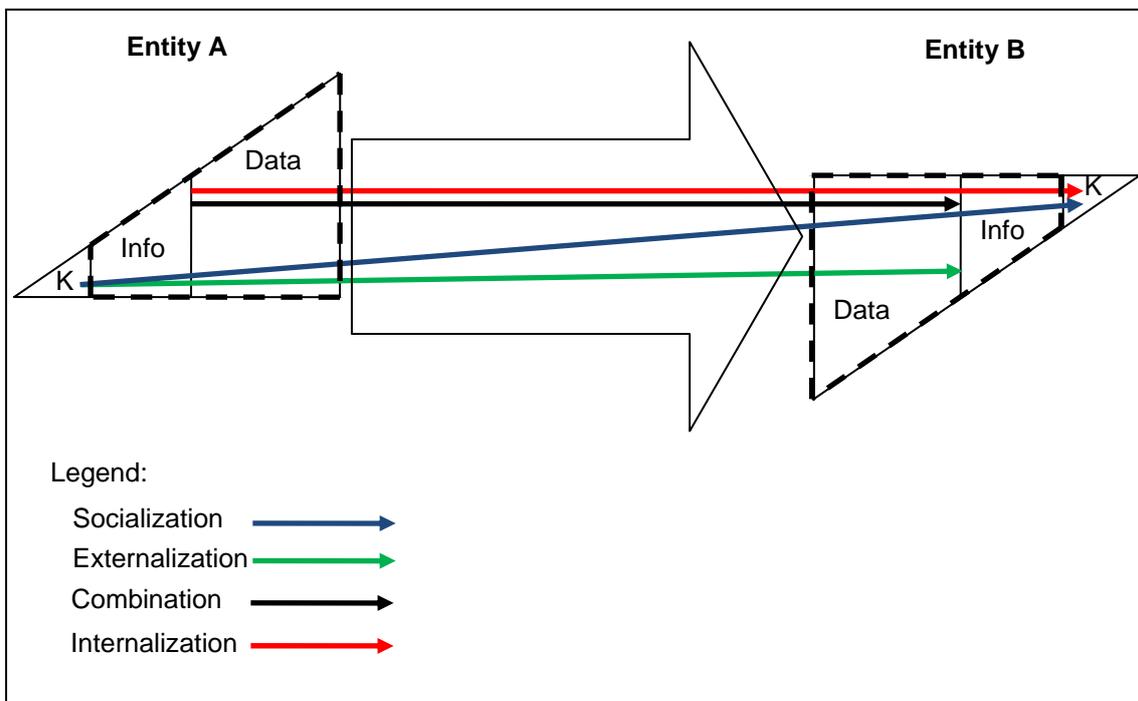
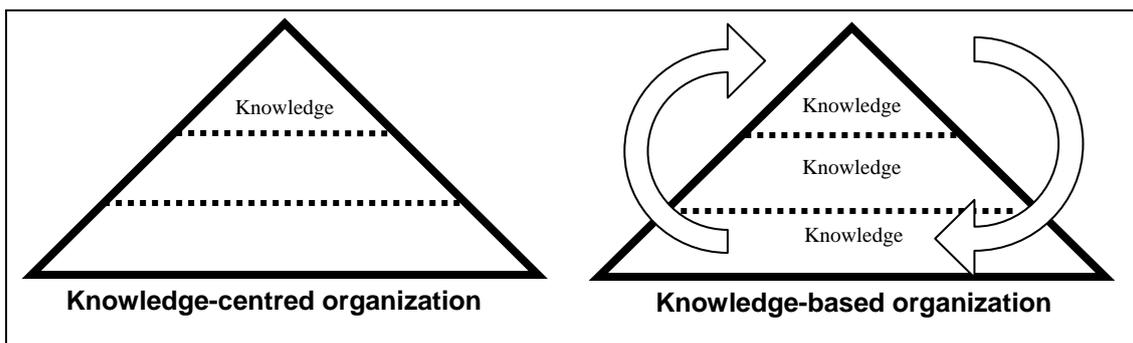


Figure 7 – Knowledge Flow and Directionality relation.

Competitive environments demands compel organizations to rethink the way that knowledge must flow within an organization. Until recent times, organizations were essentially divided into two distinct blocks - those who thought out and planned all the activities and the ones who executed them. This organizational view was based on knowledge centralization, as well as its sharing and diffusion, only among organization's higher hierarchy. The problem is that, more than ever, there is a need to take decisions at the lowest hierarchical levels namely at the operational level. Moreover, these decisions, which in a superficial analysis could be rated as minor decisions, can be powered and have an enormous strategic value. In this way, in order to line-up decisions with the business strategy defined by top level managers, knowledge must flow among all levels. Figure 8 demonstrates the difference between knowledge-centred organizations and knowledge-based organizations.



Source: Adapted from Sousa et al. (2000, p. 15)

Figure 8 - Knowledge centred and knowledge based organizations.

In this way, it is possible to create a unified organizational structure designed to conduct and execute, at all levels, the defined business strategy without losing particular contributions of each organization's agencies.

Knowledge-based organizations with high interoperability levels will be able to, more easily, absorb, produce and disseminate knowledge among all its structures. Knowledge production cycle will be faster and its contents will be richer. Figure 9 intends to illustrate the correlation between knowledge cycle and interoperability domains.

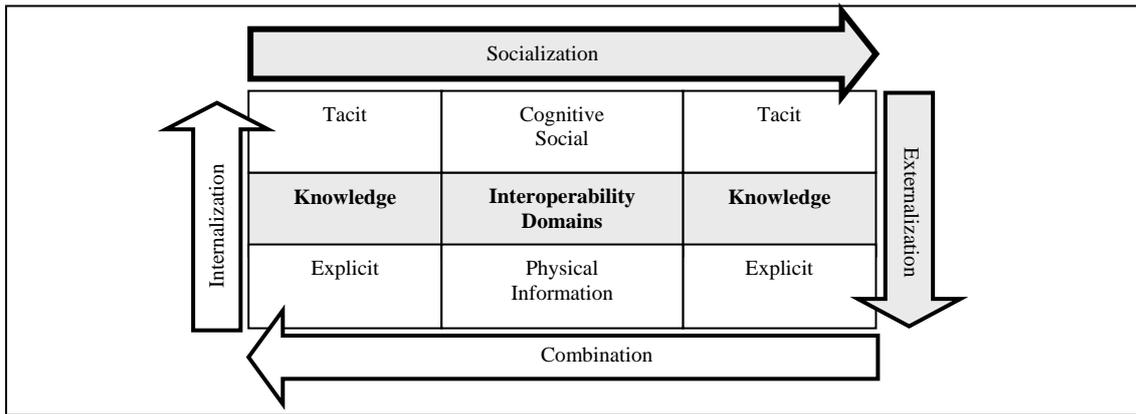


Figure 9 - Knowledge cycle and interoperability domains.

All organizations, in one way or another, perform knowledge combination. Explicit knowledge is more easily accessible, even though in some cases it's well protected. Main difficulties may be found in tacit knowledge accessibility since that can only be found in human resources. Efforts must be done to maximize this asset through externalization, in order to record collected knowledge, and invest in human resources qualification through internalization. Moreover, it is necessary to create innovative ways of interaction in order to allow people to communicate and share their experiences. It is precisely here that organizations with deeper interoperability levels gain advantage over others. Its structure and organizational behaviour promotes socialization processes enriching in this way all the knowledge cycle.

## 5. SELF-SYNCHRONIZATION

The well known expression “time is money” is based on the fact that resources that are not optimized, in time, conduct to ineffective opportunities exploitation and leads to profitability losses. In a world of so intense and complex production rhythms, organizations cannot allow its collaborators to develop work without a previous coordination of different timings. This fact leads to an unproductive resources management and consequently to a loss of competitiveness.

Some organization's reaches today so high levels of processes synchronization that can be called a “Swiss clock”. One imagines, for example, what can happen in an assembly line when a delay occurs in one single production station. All the line is affected and will suffer a delay that could be or

not proportional to the one of the station. The same happens with work rhythms of suppliers, retailers, producers... and when we speak of international organizations, the synchronization lack, the engagement incapacity of its resources, may also have serious consequences. Figure 10 intends to clarify the existing interdependence between the different activities of an organization's value chain. For instance, it can be easily concluded that organization's primary activity failure (represented by colour green) affects the primary activity of organization B that, in turn, disables the one of organization C. Therefore, it is important that organizations are able to be sure that their agencies will be able to respond at the right timing, to face a specific event.

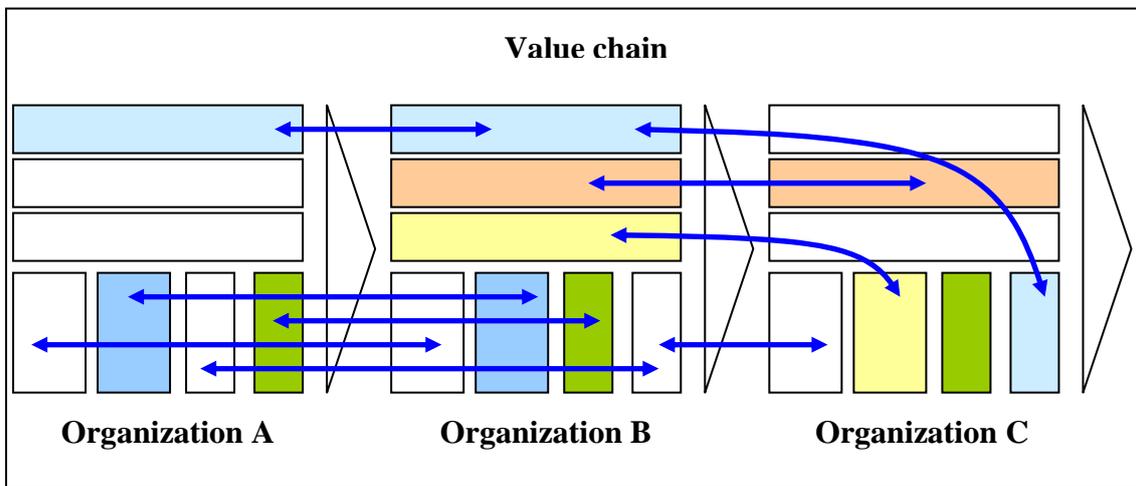


Figure 10 - Value chain interdependencies.

Although partial synchronization of organizations has a good impact to its competitiveness, current challenges require even more efficient mechanisms. Organizations must take a step forward and develop self-synchronization mechanisms. Many situations require that important decisions must be taken almost immediately, without enough time to report the event to higher level management entities. Organizations must have, at all levels, enough decision rights to take decisions and have access to the necessary means to support it. It is vital to realise that, sometimes, it's not possible to communicate with a specific company member or department at a critical moment or that the information volume and the amount of decisions to be taken can be so high that centralization of organizations processes may lead to the collapse of its entire decision mechanisms. Without differing from the defined strategy organizations must be capable "of thinking by themselves" and to take decisions without

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previous top management consultation and approval. To reach such a degree of synchronization is not an easy task. The inherent risk to produce an organizational disarticulated answer is very high. In some cases an agency can, unconsciously, compete with or even compromise the performance of another agency belonging to the same organization. For this reason, organizations must enable and stimulate knowledge flows through its entire structure. Collaborators must have access to all available information – according to their needs – in order to be able to act and decide in a synchronized way. Therefore, knowledge enables self-synchronization because it provides what is needed to take the right decision and to pursue effective actions at the right moments. This can only be possible if all members share the same information and the same context in order to induce similar procedures and develop at each individual or agency level the same response patterns, not ordering or imposing it through top management directives.

Self-synchronization is achieved when all organization's collaborators have a clear and consistent vision of the designed strategy, when high quality consolidated information (intelligence) is disseminated and shared situation awareness is achieved. Self-synchronization enables organizations to gain a highly reliable degree of information dissemination, to develop high quality processes and to enhance efficiency at all levels. This situation, will favour decision rights distribution and the empowerment of lower level hierarchical levels (agencies and collaborators). These operative conditions will help organizations to become much more agile and flexible when they have to deal with unexpected and unusual situations.

## **CONCLUSIONS**

In the past information sources were limited. This fact was explored by people who had the ability to collect it, releasing only partial contents. At that time, it was clear that who owned the information, had the power. Technological improvements allowed more than ever, the dissemination of great amounts of information at lower prices. For the same reason, access and research costs decreased substantially. Suitable conditions for the establishment of inter-organizational systems were created, mainly due to the decreasing of information costs and to the possibility to share information systems implementation costs. Knowledge and information "monopolists" saw their

“empires” collapsing due to new and more accessible communications means. Information power achieved new dimensions and became the leading factor of the value chain of almost all the products and services, currently available. Information and knowledge management techniques have gained a growing weight in an organization’s processes optimization.

It’s necessary to promote an adequate information mapping to better understand who needs it, the way it flows and how to identify possible system’s bottlenecks and future opportunities. In similar way, knowledge assets mapping will contribute to optimize human resources competencies. The correct management of this asset allows the development and implementation of knowledge production processes and contributes to its preservation. Moreover, organizations must have the capability to survey its surround environments, always taking in mind what can be an organizational risk or an opportunity, and to foresee effective solutions in the context of several possible scenarios. Competitive intelligence appears as a process/tool designed to produce contextualized information aimed to provide support for decision making. Simultaneously, counterintelligence raises as a defensive weapon against competitor’s competitive intelligence efforts. Its objective is to identify which information is critical, find out the way it must be protected and create security practices involving the overall organization. In information warfare arena, counterintelligence capability is essential. To deny critical information disclosure and release contents that influences competitor’s strategy definition process, will lead them into a disadvantageous situation, constitutes one of the major important characteristics of competitive organizations.

On the other hand, organization’s surrounding fields of interest are so dynamic that create an imperative need of larger connectivity and interoperability, in order to develop collaborative processes. This environment imposes changes at organizational’ structural levels leading to the “flattening” of the traditional hierarchical structures. This situation changed the role of networks within organizations and open the way to a new vision. The network is no longer controlled by the top management and starts to be handled by its users, reaching an auto-coordination level. All the necessary connections must be established leaving open the possibility to create new ones that can turn out to be important in near future. That is, the installed network must foresee the establishment of future relationships and the type of information needed and

must allow the constitution of other links, that in the future can turn out to be fundamental.

This organization's structural change also causes a change in the way knowledge must be explored. To line-up decisions with the strategy defined by top management, it is necessary to let knowledge flow among all organization levels. In this way, such an "intelligent structure" quickly decides, act and integrates the knowledge acquired meanwhile. This situation creates a favourable environment to self-synchronization because each part of the organization knows exactly what to do and when to do it, in accordance with its functional role, and in a close correlated way with the organization holistic view.

Military organizations integrated, in a similar way, emergent solutions. Information and Communications Technologies (ICT), with particular and specific characteristics, were also adopted by Armed Forces. It was perceived, a long time ago, that the ownership of the right information can dictate victory in the battlefield. In this perspective, some country's Armed Forces have been developing systems and doctrine that allow them to disseminate efficiently the available information and to apply the acquired knowledge in other conflicts. The expression "lessons learned" has today unquestionable relevance in military vocabulary and refers, precisely, to knowledge accumulated throughout large number of military operations. Efforts have been made in order to totally digitalize a military force, always keeping in mind, however, that digitalization is not the secret for success but it is a fundamental facilitator to obtain it. Thus, it is possible to increase a combat force operational effectiveness not by its complete digitalization but using specifically designed ICT to do the job. In order to be successful military organizations must adapt their structures and their operating principles. Units at the battlefield must be able to have access to the available information and to transmit in real time new developments, through the network built for that purpose. Organizations must create agencies with the capability to survey the enemy forces, producing contextualized information (intelligence) and, at the same time, being able to deny unauthorized access to vital information related with the current operations. This capability is provided by intelligence cells, electronic war units, recognisance, psychological operations, etc... In addition to these competencies, all units must be able to interoperate. This fact implies that all must be built in a similar framework both at structural and functional levels. The network must allow a fast integration of

new units and the transmission of new types of information, adapting to a completely different situation from the one that was foreseen. A force commander mustn't centralize the acquired knowledge. He must apply it in its units training and release it to network users. In recent conflicts occurred in the Middle East this type of initiatives, has been put in to practice. The American Armed Forces constructed replicas of Iraqi cities with the purpose of better training troops, taking into account the experiences lived in the recent past.

Technologies currently available to forces deployed at the battlefield allow the Force Commander to observe movements, in real time, of all his soldiers participating in combat actions. Temptation to centralize control can be great but, must be strongly opposed. In the modern battlefield, units must have enough decision-rights to take isolated decisions, given that they respect the established strategy and superior directives. The available time to decide is becoming shorter and shorter, challenging traditional pyramidal structures. Many decisions will have to be taken on the spot, at the battlefield and almost in real-time. Individual units' actions may assume strategic relevance to the conflict resolution. It is, therefore, essential that all units be able to, autonomously, synchronize operations in the battlefield. These operations have apparently no unique command and are the result of a set of concerted actions developed according to a clear defined strategy.

This performance level can only be reached by organizations with high flexibility, composed by professionals with the ability to quickly adjust themselves to new realities, able to perform different organizational roles. In such a way, enterprise or governmental organizations will be able to enhance their competitiveness or operational advantage over their opponents. If they can assume different organizational forms, adapting themselves to their surrounding environments, and develop external situational awareness, it is possible to expect a qualitative improvement of performance. Instead of doing more things (quantitative approach) this kind of organizations will be able to do better things.

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