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In an era of information overload, getting the *right* information remains a challenge for time-pressed executives. Is it time to overhaul your personal knowledge infrastructure?

BY DAVIDE NICOLINI, MAJA KORICA AND KEITH RUDDLE

A COMMON THREAD runs through many recent corporate setbacks and scandals. In crises ranging from BP's Deepwater Horizon oil spill debacle to the Libor rate-fixing scandal in the City of London, the troubles simmered below the CEO's radar. By the time the problems were revealed, most of the damage had arguably already been done. Despite indications that large companies are becoming increasingly complicated to manage,[1] executives are still responsible for staying abreast of what's going in their organization. But how do you keep tabs on what your competitors and employees are doing? How do you spot the next big idea and make the best judgments? How do you distinguish usable information from distracting noise? And how do you maintain focus on what's critical?

Many management experts have assumed that better information systems and more data would solve the problem. Some have pushed for faster and more powerful information technologies. Others have put their faith in better dashboards, big data and social networking. But is better technology or more tools really the most promising way forward? We think not. In this article, we maintain that the capacity of senior executives to remain appropriately and effectively knowledgeable in order to perform their jobs is based on a personal and organizational capability to continually "stay in the know" by assembling and maintaining what we call a "personal knowledge infrastructure." And while information technologies may be *part* of this personal knowledge infrastructure, they are really just one of the components.

THE LEADING QUESTION

How do CEOs stay on top of the information they need to manage every day?

FINDINGS

- **CEOs need to have formal and informal practices they can rely on. Dashboards are beneficial but not sufficient.**
- **CEOs need a diverse inner circle to feed them information and act as a sounding board to test insights.**
- **They need to question whether their existing techniques for gaining information allow them to stay on top of what they consider critical.**

We are not the first researchers to make this claim. More than 40 years ago, organizational theorist Henry Mintzberg suggested that information was central to managerial work and that the most important managerial roles revolved around information (monitoring, disseminating and acting as a spokesperson). Mintzberg described managers as the nerve centers of organizations and said informational activities "tie all managerial work together."[2] Other researchers suggested that management itself could be considered a form of information gathering and that we are quickly moving from an information society to an attention economy, where competitive advantage comes not from acquiring more information but from knowing what to pay attention to.[3] Later research confirmed that dealing with information is critical and found that managers' communication abilities are directly related to their performance.[4]

While the importance of informational roles and activities is well established, we take the idea a step further, arguing that managers — and especially senior executives — are only as good at acquiring and interpreting critical information as their personal knowledge infrastructures are. Managers rely on specific learned modes to manage and allocate their attention.[5] However, how we pay attention is not simply a matter of internal mental processes that we can do little about. Rather, attentiveness (in other words, the capacity to stay on top, and the ability to distinguish between what matters and what doesn't) mostly stems from what managers do or don't do, whom they talk to and when, and what tools and tricks of the trade they use. In short, attentiveness relies on and is facilitated by things we can observe — and things we can do something about.

Technologies and new tools are not and cannot be "silver bullet" solutions. At times, simpler things such as talking to customers or networking with board members may be more important, provided they are done methodically and with some purpose. Selecting when particular elements are appropriate depends on the circumstances. As a result, understanding and, when needed, overhauling one's personal knowledge infrastructure should be routine. In this article, we explain how this can be done, drawing on insights obtained by shadowing individual CEOs as they went about their daily jobs.[6]

Our research is based on a two-year study of the day-to-day work of seven CEOs of some of the largest and most challenging hospital- and mental health-based organizations in England. (See "About the Research.") We chose to study health-care executives because they sit at the crossroads between the private and public sectors and therefore are expected to meet multiple, often competing, demands. To say that the informational landscapes in these organizations are complex is an understatement. Yet the organizations are increasingly subject to pressures to become more transparent, even as they compete with each other. Therefore they seemed to be a good choice as settings for studying the challenges of using information and knowledge to stay on top and ahead of the curve. Throughout our research we sought to answer a simple question: How did the CEOs know what they needed to know in order to be effective at their jobs?

"Nothing but Talking"

One of the first things that struck us was that, in contrast to the popular image of CEOs as lonely, heroic decision makers, the individuals we studied did not seek information or utilize discrete pieces of evidence for the purpose of making decisions. Rather, they often sought something much more ordinary: to make themselves knowledgeable in order to be ready for any eventuality, so that they could understand what to do next. Indeed, one of their main preoccupations appeared to be staying on top of what was happening within and around their organizations. As one put it: "The worst thing for a CEO is to find yourself asking after the fact: How could this happen without me knowing?"

Notably, staying on top was not a separate activity in addition to what the CEOs already did, but rather something they mostly did without thinking and without noticing — or something that they achieved while doing something else. Calling a former colleague who was in the news for the wrong reasons (an accident, a bad report from inspectors, protests about the closure of a loss-making hospital) can produce multiple outcomes: reinforcing a relationship and demonstrating solidarity, but also finding out what is going on. Indeed, many of the CEOs had difficulty acknowledging that checking in with people was an integral part of their job — hence the

ABOUT THE RESEARCH

To uncover how top executives deal with information and knowledge, we conducted an observation-based exploratory study using a rigorous ethnographic protocol successfully employed in the past. We followed seven chief executives through their working days for several weeks. We went where they went, watched what they did, listened to what they and others said and asked what was going on when we did not understand. We also discussed our findings with them and with invited colleagues as part of structured feedback sessions.

Our sample comprised seven CEOs of acute and mental health organizations that are part of the National Health Service in England. In England, health care is provided by public sector bodies called trusts. Our sample included organizations that run multiple hospitals, have an annual budget of more than 500 million pounds and have up to 10,000 employees. The CEOs have both legal and financial responsibility. The sample included both men and women (3:4). The CEOs had diverse professional backgrounds (NHS management, private sector, nursing and medical) and were at different points in their careers, both in terms of tenure in their present post and overall experience at the CEO level. The sample also included organizations with different performance levels according to indicators by which their performance was monitored by national regulators (for example, financially sound vs. struggling).

CEOs were observed for five or more weeks, apart from one subject, where observations lasted 3½ weeks. The researchers had good access to the CEOs and were able to document nearly all aspects of their work, with exceptions such as one-to-one supervisory meetings with junior colleagues, HR-related meetings concerning individuals and private meetings with patients. When CEOs worked from home, data was collected in interviews afterwards. We conducted semi-structured interviews with five of the CEOs and a number of informal interviews with the other two CEOs. In addition, we conducted two formal interviews with two different personal assistants, which were recorded and lasted approximately half an hour each. Additional data came from meeting papers, articles referenced by the CEOs and copies of publications consulted, and they were supplemented by externally available information such as annual trust reports and regulatory documents. Following the study, our results were shared with two groups of CEOs at dedicated sector events. Those CEOs helped us to refine our findings and elaborate on the notion of the personal knowledge infrastructure.

often-heard comment, "I do not know what has happened to my workday … It seems I have done nothing but talking."

The Personal Knowledge Infrastructure

The CEOs we studied didn't leave the process of staying informed to chance. Rather, they relied on a habitual and recurrent set of practices, relationships and tools of the trade, which constituted a personal knowledge infrastructure that supported them in their daily tasks of understanding, foreseeing and managing. This tacit and rarely discussed infrastructure, which was very different from their IT system, helped them to know what needed to be done and to get a sense of the right way forward. What made some CEOs more effective than others was not merely the characteristics of the individual components of their personal knowledge infrastructure but also the quality of the whole and its fit with the specific needs of the job. This personal knowledge infrastructure comprised three main elements: routine practices, relationships, and tools and technologies.

First, every CEO had a set of routine practices she or he relied on — things such as checking the morning news, running periodic review meetings, dropping by immediate collaborators' offices to ask what was often "just a quick question," walking around and occasionally even going to the cafeteria "to check how things are going." These practices were not just internal. The CEOs also met with board members and managers of other organizations, attended conferences and staff events and participated in ceremonial functions such as charity events. Some of the gatherings were framed as leisure opportunities (having a drink, playing golf), but they weren't entirely social. CEOs returned from such events with information and news they shared with various associates. Similarly, sitting on boards of other organizations was often seen as a necessary evil that helped the CEOs get a broader overview of what was going on beyond their organization.

Second, the personal knowledge infrastructure contained a number of social relationships. Like prior researchers, we found that most CEOs' work was conducted verbally and was accomplished with and through others. Our CEOs used their relationships both to gather information and to make sense of it.[7] For example, every CEO we studied carefully cultivated strategic relationships within and outside the organization. These relationships were usually engineered to produce a combination of breadth and depth of intelligence. Their network of contacts constituted a form of social capital that had been accumulated over time. On many occasions, we observed CEOs interacting with long-term colleagues, previous members of their staff and people with whom they had done business. They used their contacts to gather weak signals (on the principle that today's gossip can become tomorrow's news), triangulate information and confirm or contradict their evolving insights. Some of the CEOs were extremely strategic and nurtured relationships with various stakeholders (for example, management consultants, politicians or local leaders), whom they saw regularly for dinner or a drink. Some CEOs also relied on small groups of peers, whom they met with on a regular basis. These groups of peers, who were often also "comrades in adversity" facing similar challenges, operated both as a support group and as a precious setting where sensitive information was exchanged on the basis of reciprocity.

However, not all of the contacts were treated the same way.[8] The CEOs appeared to have an informal hierarchy: those who were more distant, who could be used as a source of signals and needed to be taken with a grain of salt; those who were trusted and tended to provide reliable intelligence (for example, board members or colleagues, as well as their assistants); and finally, those with whom the various streams of information could be discussed and processed — the inner circle. All of the CEOs in our sample relied heavily on such an inner circle, usually composed of selected executive team members with whom they had the most intense interactions. The CEOs used these individuals not only to obtain information, often informally (given the open-door policy that was in operation for most CEOs), but also as sounding boards to test emerging understandings and reconcile possibly competing insights. These interactions allowed the CEOs not only to connect the dots but, more importantly, to figure out which information qualified as a dot that had to be connected further.

Finally, the CEOs' personal knowledge infrastructures included a variety of tools of the trade. These included traditional tools such as phone, email, reports and journal articles from industry magazines, as well as less traditional sources such as Twitter, blogs and other social media. Most CEOs utilized some form of electronic reporting system or audit-based dashboard that helped them track critical performance indicators, and most consulted these tools regularly, but the sophistication of the tools varied substantially. (See "Components of a Personal Knowledge Infrastructure.")

Although most CEOs had a small pile of "will read" books in their office, they rarely had time for books or magazines during the course of a working day. Personal preferences played an important role here, more so than in the two previous categories. For example, while some CEOs relied heavily on mobile phones for calls and texts, others used email almost exclusively. Contrary to our expectations, most of the CEOs dealt personally with a range of emails — this was how their work was done. Some CEOs made very little use of written documents and required short summaries. Others wanted to have complete documentation "just in case." Some CEOs still found comfort in printed paper; few were happy to go paperless.

One critical aspect of personal knowledge infrastructures was the extent to which individual elements were often intended to support each other. For example, CEOs who liked to run large formal meetings also invested significant time in social relationships, consulting collaborators on a one-to-one basis. The CEO of an organization that was struggling with issues of trust and hidden or misplaced information was working to triangulate soft data with hard knowledge. This often required him to follow up with people individually (for example, phoning staff members directly to corroborate information or requesting documentation from outside sources) while also working to set up formal structures currently lacking.

How the Personal Knowledge Infrastructure Evolves

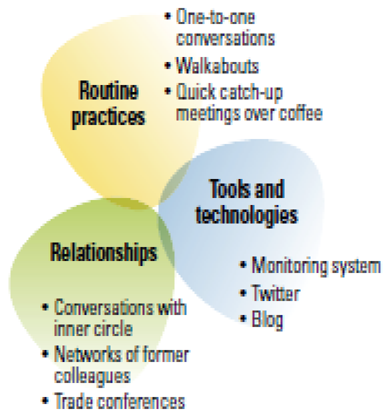
Although all of the CEOs relied on a personal knowledge infrastructure, how these were composed varied greatly. We saw differences across all seven CEOs in terms of whether personal knowledge infrastructures had particular elements and also the amount of emphasis each element received. Two examples illustrate how different personal knowledge infrastructures contrasted with specific leadership styles in different situations.

CEO 1: Knowing the Details in a Struggling Organization A newly appointed CEO was running a struggling hospital-based organization that was receiving increased regulatory attention for financial reasons. His personal knowledge infrastructure was designed to help him closely monitor his organization. He ran large, often long, weekly management meetings that provided an opportunity for all team members to examine operations and share and obtain a wealth of information. After the formal meetings, conversations continued in the executive offices. The CEO spent the bulk of his time in regular meetings with local managers of health-care organizations and funding agencies, picking up signals and providing insight into the work and progress of his organization. He also spent time working on wards and visiting and talking to staff. Moreover, he cultivated a wide network of colleagues whom he often consulted in rather informal ways and maintained external links to support his key strategic tasks. He had an open-door policy, both as a symbol of change and as a permanent invitation. He felt comfortable digging through reports and documents, and he set aside time on trains to go through what he called "the train pile of documents." Though the CEO used the phone and the Internet, he liked to attend conferences and networking events to develop a broad view of the business environment.

CEO 2: Managing Via a Mix of the Formal and Informal The second CEO, who had been in his position for more than five years, used a very different set of practices and tools. He worked with an established team to run an organization that prided itself on its ability to achieve operational excellence and strategic growth. Throughout the day, this CEO had a series of chats with executives, which often expanded into conversations between him and several people. Indeed, much of his working day was spent in what appeared as free-form interaction: sharing information informally, only sporadically framed by discussion about an immediate problem concerning a patient or a medical concern. This CEO rarely attended local meetings, so the other executives were an information gateway to local strategic issues for him. However, the headquarters-based, executive-team orientation was reinforced by several other structures, relationships and tools, purposefully arranged by the CEO so he could remain in the know. First, there was an executive who the CEO felt had a very different approach from the others, which gave him another voice and view to consider. The CEO also had an IT performance system, which he consulted every morning and which allowed him to identify any serious performance issues in the organization without needing to rely on reports from executives. The CEO supplemented such insights with visits to wards and other areas of the hospitals late in the evening and on weekends, which allowed him to gain informal insights from veteran staff. The internal systems were supported by national-level policy work and involvement via leadership positions in sector organizations and initiatives and networking. These allowed the CEO to both formally and informally stay in the know regarding strategic issues of potential relevance, and also to influence their direction to the benefit of his organization.

COMPONENTS OF A PERSONAL KNOWLEDGE INFRASTRUCTURE

To stay on top of things, CEOs need a combination of three elements: people who feed them information and act as sounding boards; routine activities; and technologies that allow them to track performance and pick up signals. These elements constitute a CEO's personal knowledge infrastructure. What comes to the CEO's attention and what stays under the radar depends on the makeup of this infrastructure.



What Makes It Personal

As we have seen, different CEOs use different knowledge infrastructures that reflect both what they personally need and where their organizations are at a particular point in time. In each case, the context was particularly relevant. We saw different types of knowledge infrastructures (in other words, combinations of tools, practices and relationships) in relation to seven factors:

The CEO's Experience More experienced CEOs often had a more defined personal style that they carried with them when they changed jobs. Some had specific practices that they tried to reactivate in the new workplace and a network of contacts that constituted the social capital they had accrued over the years; we saw this in the case of a CEO facing an operational challenge in his new organization, when he called a former colleague for advice.

Job Tenure The more time CEOs spent in the same organization, the more they learned, often the hard way, about sources they could trust and how they could make these sources work, given their existing infrastructures and approaches to work.

Makeup of the Executive Team and Board The composition of the top management team, how competent its members are perceived to be and how well they work as a team affected the makeup of the inner circle. CEOs often included in their inner conversational circles directors who were easy to talk to or were particularly good at collecting and relaying intelligence. However, many CEOs, like the second CEO discussed above, also saw value in having friendly "devil's advocates" on staff who were able to present different views and act as meaningful counterweights.

Organizational Conditions and Pressures Organizations with different financial, efficiency, quality and safety environments posed different issues for the CEOs. When the conditions changed, they had to retune their antennae accordingly. A particular challenge involved the tools and technologies available. Systems can be powerful but are costly and difficult to change. Most CEOs worked to modify and develop existing systems but often they didn't have a lot of room to make immediate changes. They worked with what they had while instigating long-term interventions so that the system would suit them rather than the other way around.

Strategic Vision Entering new markets or introducing new products or services required CEOs to adapt their personal knowledge infrastructure accordingly. For instance, a CEO facing a possible merger began adding M&A events to his calendar.

Economic, Competitive and Regulatory Environment The macro environment determined whether a CEO's personal knowledge infrastructure was appropriate. Changes in the environment forced CEOs to adapt their existing personal knowledge infrastructure and reactivate old relationships.

The Kind of Manager the CEO Wants to Be Ultimately, the above factors were filtered through the prism of "what kind of manager I would like to be." For instance, a CEO who valued transparency and closeness to his organization's users established a strong presence on social media and utilized this channel to garner insights into the experience of patients and their families. This sometimes allowed him to identify problems (such as low quality of service in a particular location or low staff morale) before his managers reported them.

Taken together, the factors above suggest that effective personal knowledge infrastructures tend to be unique and personal and conform to the preferences of the manager. They need to be continually adapted, tweaked and refined in keeping with the shifting nature of the CEO's job, the environment and new opportunities.

Although most of our CEOs were reasonably successful, everyone saw room for improvement. Indeed, a CEO's effectiveness was a reflection of his or her situation and person-specific alignment. For example, one CEO had spent years building a

HOW TO IMPROVE YOUR PERSONAL KNOWLEDGE INFRASTRUCTURE

For CEOs or other executives concerned about improving their personal knowledge infrastructure, we have developed six steps designed to initiate learning and reflection. Examine the following:

1. Take stock of what you do now — what tools, practices and relationships do you use in day-to-day work?
2. Perform an initial personal assessment of whether your personal knowledge infrastructure is currently fit for the purpose intended, using the questions we provide. (See "Evaluating Your Personal Knowledge Infrastructure.")
3. Ask a peer, mentor or coach to observe you and help you observe yourself and reflect.
4. With a trusted peer group, discuss how each person in the group operates and what differences you deploy within your different personal knowledge infrastructures.
5. Develop a personal plan to rebuild and enhance your personal knowledge infrastructure over time.
6. Put the plan into place and set a goal of continuous learning, committing to specific dates (for example, bimonthly peer group meetings).

sophisticated IT performance monitoring system. Another CEO didn't see having such a system as a priority; in his view, being an effective manager entailed moving away from operational considerations and focusing more on strategic and systemwide issues. The challenge of changing as the organization changes was highlighted by several CEOs: The personal knowledge infrastructure that serves you well during a period of crisis and turmoil may get in the way in calmer waters. The lesson is that there is no single best personal knowledge infrastructure. Through personal reflection, managers and CEOs need to learn how to ask themselves difficult questions regarding the *quality* and *fit* of the practices, tools and relationships that they rely on to become knowledgeable. They also need to develop structured ways of asking such questions consistently and over time — rather than waiting for something to go terribly wrong.

EVALUATING YOUR PERSONAL KNOWLEDGE INFRASTRUCTURE

Executives can use the six questions below to create personal knowledge infrastructures to match their own particular circumstances.

Four Traps

The quality and fit of the CEO's personal knowledge infrastructure is critical because it determines how he or she sees the world and defines himself or herself as a manager and CEO. It is the prism through which managers understand what is going on, and it provides the horizon of information sources through which this understanding will be probed and evaluated. However, a poorly designed personal knowledge infrastructure can lock the manager inside an information bubble and create information biases and blind spots.[9] Managers may only realize this when something happens that was not on their radar or when an incident exposes the misalignment between the current demands and needs of their job and their own role. By closely examining the work practices of our CEOs over time, we identified four potential traps:

1. Not Obtaining the Information You Need Although conventional wisdom suggests that the main problem for today's executives is too much information, the real problem is not enough *relevant* information. Due to insufficient monitoring, an inappropriate mix of monitoring practices, inadequate or insufficient social relationships, and information overload, managers can find themselves without the information they need.

2. Developing a Personal Knowledge Infrastructure That Points You in the Wrong Direction A typical problem with personal knowledge infrastructures is that they can be poorly aligned with the demands of the job. For example, if a CEO wants to foster innovation but the infrastructure informs her about operational issues only, the CEO is likely to focus on things that aren't of primary importance. A personal knowledge infrastructure not only reflects the rules of attention but also shapes those rules. Researchers have highlighted lessons from major spectacular failures from the past, from the Challenger space shuttle disaster to the global financial crisis.[10] Many of the managers in question were completely current on the wrong information — or information about the wrong things.

3. Setting Up a Personal Knowledge Infrastructure That Is Not "You" A manager's personal knowledge infrastructure can clash with his management style, both in terms of what he does, the tools he uses and the type of manager he would like to be. In our study, we observed a CEO who wanted to be a manager who delegated. However, his personal knowledge infrastructure systematically drove him to focus on details, which led him to take a hands-on approach — against his best intentions. The most effective managers we observed were those who reshaped their personal knowledge infrastructure to fit their work, their management style and what they considered important.

4. Starting With Technology Rather Than Personal Need Last, some managers make the mistake of addressing the issue from the wrong end — considering technology first rather than later. Rather than being technology-centered, personal knowledge infrastructures need to be geared toward personal development, not toward buying new technologies. Rather than asking, "Is this technology good?," CEOs should ask, "Will it do any good for me?"

Improving Your Personal Knowledge Infrastructure

So how do managers improve their personal knowledge infrastructures? We found that although CEOs easily recognize the importance of their personal knowledge infrastructure, they very rarely pause to reflect on its effectiveness and fit. More often than not, they discover its inadequacies through comparison with others' practices or, more commonly, following breakdowns and failures. Developing, refining and testing the effectiveness or present fit of your personal knowledge infrastructure should be routine. (See "How to Improve Your Personal Knowledge Infrastructure," p. 62.)

There is a great deal that individuals can do for themselves. The starting point is being aware of the composition and functioning of your personal knowledge infrastructure and also being candid about its internal contradictions, potential misfits and misalignments. In our study, we found that this was best done through discussions with others: a mentor, a coach, colleagues or a trusted counselor. After all, your personal knowledge infrastructure is very much a part of you. Having a personal knowledge infrastructure in place is one thing; being honest about how well-suited it is to your particular circumstances is very different.

To this end, in addition to studying CEOs in action, we developed the outlines of a reflection and developmental process one can apply to one's own circumstances. This is a framework to guide individual and peer reflection, built around a set of questions. (See "Evaluating Your Personal Knowledge Infrastructure," p. 63.)

Being a manager in today's complex world requires becoming information-savvy in ways that are manageable and work for you in your specific context. What we learned from the CEOs we studied also applies more broadly to executives in general. Becoming and remaining practically knowledgeable is a critical task. It is a capability that managers need to learn, develop and continually refine, and it becomes increasingly important as the manager moves through his or her career and up the corporate ladder, when the risk of information overload significantly increases.

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5. This had been already found by organizational theorist J.A. Chilingerian, who observed the same type of executives we discuss here. See J.A. Chilingerian, "Managing Strategic Issues and Stakeholders," in "Building the Strategically Responsive Organization," ed. H. Thomas, D.E. O'Neal, R. White and D. Hurst (Hoboken, New Jersey: John Wiley and Sons, 1994), 189-213.

6. In addressing the issue of managing knowledge on a personal level, academics have mainly focused on identifying abstract competencies (for example, cognitive, informational and social skills) without clarifying how they look in practice and how they can be acquired. Consultants, on the other hand, have often either embraced the technological way exclusively or developed their own theories for how things ought to be, based on limited empirical evidence. In particular, for some, Web 2.0 tools appear to constitute the panacea that will solve the current problems of increasing information overload. However, there are long-standing warnings that technology alone can never solve the knowledge management needs of both individuals and organizations. For the academic perspective, see, for example, K. Wright, "Personal Knowledge Management: Supporting Individual Knowledge Worker Performance," Knowledge Management Research & Practice 3, no. 3 (2005): 156-165; and M. Świgoń, "Personal Knowledge and Information Management: Conception and Exemplification," Journal of Information Science 39, no. 6 (December 2013): 832-845. For a discussion from a consultant's point of view, see L. Razmerita, K. Kirchner and F. Sudzina, "Personal Knowledge Management: The Role of Web 2.0 Tools for Managing Knowledge at Individual and Organisational Levels," Online Information Review 33, no. 6 (2009): 1021-1039. See one warning as pointed out by R. McDermott, "Why Information Technology Inspired but Cannot Deliver Knowledge Management," California Management Review 41, no. 4 (summer 1999): 103-117.

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