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A Whitepaper By
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WELCOME TO THE SERENDIPITY ECONOMY

Industrial age economics obscures economic activity that doesn't fit neatly into its models of productivity and efficiency. In an ever more connected world, a new framework is required that accounts for the value derived from seemingly random and unanticipated encounters and interactions. The Serendipity Economy framework posits six attributes that identify faults in our current analysis. It explains why future value can't be forecasted, and why organizations should spend more time monitoring the networks that represent modern information and knowledge work, in order to act on serendipity when it occurs, and account for it as a part of their value.

The Serendipity Economy is an economy of facilitated accidents. It is an economy unfathomable at the macro scale without the Internet. Innovation and serendipitous activity, by its nature, is limited to those who are connected. In the past, it was impossible to experience a serendipitous event without physical proximity. Digital networks increase the bandwidth for serendipity. It creates a larger context for the exchange of ideas that might lead to something of value.

The Serendipity Economy is strikingly different than the industrial economy, or even the information economy, because both of those models are driven by models of efficiency. Although productivity gained from mediated-digital-networks contributes to productivity, it is not their only, and perhaps not even their largest contribution. The idea of a Serendipity Economy suggests an economic model that is emergent and unpredictable—one that unfolds toward the future, not in a linear way, but rather through randomness and happenstance. The Serendipity Economy exists alongside the industrial economy, but because we rarely look at serendipity in a systematic way, and because we can account for enough benefit from industrial age economic perspectives to justify almost anything, we let the Serendipity Economy go merrily along through anecdote and fold tales. We let the Serendipity Economy happen to us because it falls outside the experiences we have been taught are measureable. And because we aren't looking closely, we put all of those "intangibles" into a conceptual bag together and look at them as extras when we can find a measurement, and too difficult to measure when we cannot.

Prevalent industrial age measures and mindsets mask Serendipity Economy activity because they focus attention on incremental improvements in efficiency rather than looking for, or even acknowledging, the deep reorganizing power of serendipitous activity.

Consider this story:

Location: Sydney, Australia. A second year Deloitte consultant in Sydney, Australia has an innovative idea to help a client. He posts it to Yammer at 6pm with the question: "Will the client be amenable to this solution?" An hour later, a risk services partner in Melbourne suggests the young consultant connect with one of two partners. At 8pm, the Head of Consulting chimes in and facilitates the conversation, directing the young consultant to one partner over the other. The next morning the consultant and the partner discuss the suggestion and it is presented to the client.

Deloitte Australia CEO, Giam Swiegers, believes that prior to the implementation of the Yammer social networking platform this idea would have been lost. A demoralized young consultant would not have found the right connections for his idea, and would give up in light of insurmountable organizational friction.

The Serendipity Economy thrives on people meeting each other to solve problems, on tipping points in technology, on conversations that lead to revolution, or those that offer lessons learned, even simple introductions to neighborhood restaurants. The Internet, and the technologies that have been built on this basic backbone of interconnections, are designed primarily to reduce communication friction, and as a result, metaphorically, the distance between people and their knowledge, or between people and

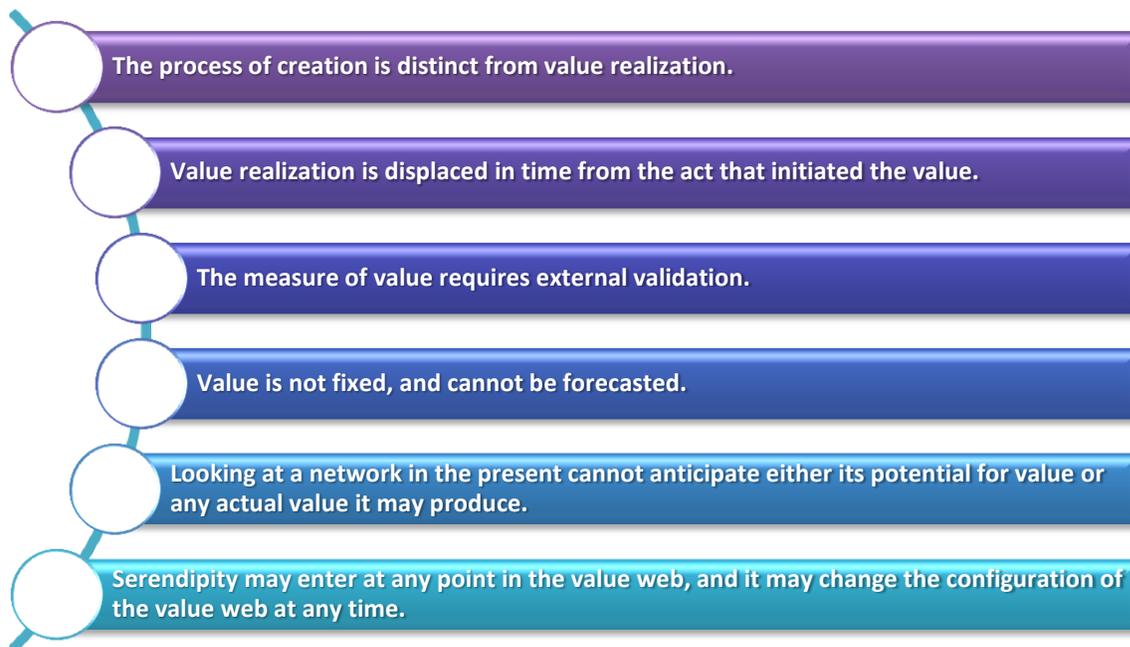
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data. When combined, these attributes facilitate the exchange of information and opinion, request and response, question and answer, among ever widening groups of people.

These attributes can clearly be described as efficiency. What those who measure productivity fail to recognize are the conversations and ideas transmitted over these efficient means of communication. There is no guarantee because an efficient network exists that people will use it, use it in a meaningful way, and if they do, what the outcomes derived from that use will yield. Those activities are serendipitous, unexpected, emergent and more often than not, completely unmeasured or undocumented. Thus the economic value of many technologies goes into the real of excitement, and companies like Apple are permitted to use to the term *magic* to describe a benefit.

There is nothing magic about the way the Serendipity Economy works, we simply have not created a language to describe it or prioritized measurement systems to account for it.

This paper presents six observations about the serendipity economy distinctly at odds with industrial age economic measurement practices. These include:



These attributes offer a contrast to industrial age productivity metrics because they focus on outcomes, not outputs. Traditional productivity measures are adequate for measuring the development of a presentation, a circuit board assembly or a sales report. More inclusive forms of productivity measurements, such as Total Factor Productivity, attempt to capture more nuances and to account for intangibles, but no industrial measure adequately addresses the issue of the very real discontinuity between production and value realization which is an important characteristic of knowledge work, nor do they capture the complex potential represented in ever-changing human social networks. The use of

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industrial age economics constrains individuals and organizations from seeking, noticing and realizing value from activities for which no forecast can be made, no realized value anticipated.

This is not to say that value does not exist in a Serendipity Economy, but that value emerges from complex networks that cannot be modeled in the same way as the industrial age's linear processes. The network holds a serendipity potential, but when that potential is realized, the nature of the value that it generates or the magnitude of its returns, is impossible to anticipate.

The Serendipity Economy framework suggests these underlying principles as the result of observations and investigations into how people work, and how they perceive the world when constrained by frameworks that no longer match the reality of their activity, yet remain the only accepted forms of measurement to reflect progress and accomplishment.

This paper attempts to define several of the attributes of the Serendipity Economy. It makes no claim to exhausting all of the potential perspectives. For the most part, the paper also stays away from academic comparisons in order to crystalize the principles in a consumable form.

The process of creation is distinct from value realization

Consider the process of creating a presentation. The act of creating the presentation fits within the traditional model of industrial age economics. Precise measurements can be made about how productive the author of the presentation is by examining how long it takes him or her to accomplish certain sub-tasks within the creation process: inserting an image, formatting bullets or applying a design template. Those sub-tasks can be compared to how efficiently others use the same tool, how easy it is to do that sub-task in one tool versus another, and how one version of a tool increases or decreases the efficiency of all people using it. Further, the aggregate time to create a presentation of a given level of complexity can also be benchmarked. This "productivity" view is where most software companies continue to spend their time, and most software-as-productivity proponents concentrate their marketing dollars: convincing customers that an upgrade to a new version will make them more productive.

Given an industrial age framework, the use of software can only reduce time or cost, and its product, in this case a presentation, cannot be presumed to meet its objective at the time the product is delivered.

At the time of creation, however, no one knows what value any presentation will yield. The presentation clearly has costs associated through time and overhead, but no value can be assigned beyond associated costs. Any anticipated value is pure speculation given the number of variables involved in realizing that value extends well beyond the presentation file. Presentations are designed to deliver information, to change perceptions, to facilitate a decision or other activities that are independent of slide creation, text insertion, table formatting or graphic development. The value realization of a presentation comes at the time it is presented, not at the time it is created. The delivery process is always unrelated to the creation process regardless of the presenter.

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The Serendipity Economy framework yields to productivity as the proper construct for gauging the effectiveness of the tool and processes associated with content creation, but it challenges any presumption of value associated with the output because another process, in this case, a presentation in front of an audience, is required before the value of the presentation work can be determined.

Value realization is displaced in time from output completion

This then leads to the next characteristic of the Serendipity Economy: time displacement. For the individual or organization to realize value from the presentation that was created, it must deliver that presentation to an audience. The Serendipity Economy framework asserts that there is always a displacement in time, between the productive output of the creation process, and the delivery of the output of the creation process to the audience. That time may be measured in minutes in the case of a hastily created presentation delivered to an internal team, or months when the presentation is intended for an academic conference.

Combine this characteristic with the first one and it becomes evident that certain, well understood practices, like pay for performance, become much more fluid in the Serendipity Economy. A factory assembly person contributes their labor to an assembly that has a fixed value at the time it is shipped, so their contribution can be anticipated ahead of that shipment. This is represented in productivity by the ratio of inputs and outputs. Once the assembly leaves the factory, accounting rules allow the manufacturer to book revenue associated with that assembly. For the factory worker, there is no displacement between the application of his or her labor, and realization of value outside of the accounting practice of pay which may displace the transfer of that value to the individual by a few hours to a few days. The accounting system, however, would immediately reflect time worked on a particular assembly with future pay.

What if that same factory worker discovers an improvement in his or her process that leads to dramatic savings? Although that person may receive a one-time bonus, the process would yield results over a long period of time. That serendipitous event becomes an anomaly accounted for not as contributory participation in returns, but as an artifact outside of normal business. Once the improvement is implemented, its inventor will probably return to his or her hourly work, now based on a different, but nonetheless repeatable and predictable level of output.

In the case of the presentation, although a salaried employee may be paid for the time worked on the presentation, or an outsourcer paid for its creation, there is no equivalent value to be booked at the time the output (the presentation) is delivered, nor even at the time it is shipped to the conference for inclusion in proceedings, a CD or a website. It is not until the presentation is shared with an audience that its value is unlocked. And it is not until it is shared with an audience, in person or through posts of other forms of access to the content, that its value can even be assessed, let alone determined.

The measure of value requires external validation

The production process does not recognize the value, although it absorbs it. Determining the value of a serendipitous event cannot be determined within the process that spawned it. External validation is required to measure value.

In an industrial age economic equation, the basic value of a good is determined by markets, and that value fluctuates. For an established business, most fluctuations are absorbed by accepting lower margins or through price increases, although a number of other actions are possible. In all cases, however, the good has a value associated with it, and that value is intrinsic to the process that created it for the market being served. In other words, when the good is created, it has a value associated with it that reflects its costs and a profit margin that the market is willing to give the supplier for the perceived value in excess of cost for the good. Even goods that cannot establish value for their intended use still contain raw materials which translate into scrap or salvage value.

A presentation can be considered an industrial age good. A presentation has no salvage value. It is created and delivered as a set of bits. A presentation is a Serendipity Economy product, not an industrial age good, because its job is to change a person's mind either through information or influence of argument. Without context and delivery of some sort, either through presentation or reading, the presentation has no intrinsic value. Its bits, no matter how ordered or elegant, have no value on their own that can be calculated by looking at them within a market of bits. In the Serendipity Economy, the bits must not only be ordered, but transmitted. At the point of transmission, where change occurs, an entirely different process must be invoked, one of assessment, that places an instrument into the activity to determine if value has been realized or not. This holds for social networks, for education, for preventative health care and a number of other areas where productive processes separate from value and where value is displaced in time from its delivery.

The act of value realization for the presentation requires context as well. It is not simply enough to ask people who have read the presentation if it is good or bad. The presentation was developed with a particular intent. The presentation takes place in a context that becomes part of the overall experience, and therefore, cannot be separated from the outcome of the experience. Presentations or other "stage-like" experiences are themselves often called "productions" and indeed, the set-up of an event is a very process-oriented, industrial age activity, even if the event is to be delivered online. Certain steps are required and the more efficient those steps, the lower the cost of delivering the presentation. But as with other industrial age insertions into Serendipity Economy activity, the production of the event and its efficiencies are completely irrelevant if the goal for the presentation is not achieved, and that achieved value, can only be determined by determining the state of the attendees prior to the presentation, and then assess the change made to them by the presentation experience. And again, the context is important, because even the most adept presenter with the best material can fail to meet his or her goals if the environment is not conducive to message delivery, or if the audience is not open or available to receive the message.

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For a typical presentation, the following variables might be assessed in order to describe the context that would bear on the perception of value:

- The audience's willingness to hear the message
- The presenter's capacity for persuasion
- The temperature of the room
- Sound system quality
- Distractions during the presentation
- The number of people in the room
- The quality of the seating
- What time of day the presentation was given
- What speaker immediately preceded the speaker being assessed
- The perceived success or failure of the previous speaker
- The quality of the presentation materials
- The length of the presentation
- When the survey instrument was delivered
- Clarity of survey instrument instructions

This list is not exhaustive, but illustrative of the challenge required to determine the ultimate value of Serendipity Economy outcomes. The introduction of context adds another layer of displacement that moves value realization away from production. Although many of these attributes appear to be common quality attributes, their application to Serendipity Economy differs because they would be used to describe context, not results themselves. In a production oriented evaluation, these attributes would be considered useful indicators of quality or performance for the event staff or the facility staff, not the presenter.

It must be noted that formal assessment of a Serendipity Economy activity can only provide first order results. At an event, for instance, once the context is established and the initial state of the attendees documented, perception shifts can be determined by asking follow-up questions and analyzing the stated change. Assume that the presentation is a marketing presentation and the goal set is a 50% conversation rate. If a survey was given before the event and one after, success would be determined when 50% of the people who attended the session said they were more likely to consider the product being discussed after the presentation than before.

A presentation may involve secondary Serendipity Economy outcomes such as the exchanging of business cards, or a member of the audience connecting with the speaker via social media. These secondary effects require additional assessments and associated relationship metadata, so that any eventual value from them can be tied back to the event and its context.

Unlike an industrial age product that retains some value to its market regardless of any later fluctuation in selling price or perceived value, the Serendipity Economy has no such fixed value. The delivery of a presentation, for instance, may generate very different outcomes each time it is delivered.

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It must be noted that in the Serendipity Economy the creation of an assessment instrument and its eventual value falls under the same rules as the presentation delivery the survey is designed for. The value of survey cannot be determined, like the presentation, until it is applied.

External validations become even more abstract if the idea of influence enters into the model. It may be that the perception change was inherited from another consumer who attended the seminar and then, through social media or other interactions, influenced the purchasing act of a non-attendee. Even with an external process in place to ascertain what drove the purchasing action, the person taking the action may not be able to communicate the chain of events that led their “relationship” member to influence the purchasing decision. In the Serendipity Economy, information is often lost because current measurements are too narrow to capture the data about an event. In this case external instruments would be required to monitor influence, as well as advocacy, to model the entire chain of behaviors that led to the purchase.

Value is not fixed, and cannot be forecasted

For an industrial age assembly, some contract value would be determined at the time the order was placed. The manufacturer could forecast revenue based on its ability to deliver against its backlog. Make the part → realize the revenue.

In the presentation example the value realized from the perception change would commonly be categorized as intangible. It would most likely be assigned to a performance indicator like *brand equity* which has no direct correlation to any future revenue.

Although it might be possible to build a model that suggests under certain circumstances what an increase in *brand equity* would yield in terms of increased revenues, that presumption would be purely speculative. Remember, in this case the presentation’s goal was a 50% conversation rate of the audience to *consideration to buy*, not actual purchase. Actual purchase action would require another external validation, and would likely be even further in time from the process of presentation creation. And as already discussed, the follow-on, secondary activities, such as relationship establishment, could have other valuable outcomes discrete from the intended goal of perception change.

Not until the perception is transformed into consumer buying action does revenue get realized. Value may be determined prior to revenue realization depending on the metric being used, but the realization of revenue for the actual product being discussed in the presentation is yet another process. That product being sold may fit within the constraints of industrial age accounting, but the marketing of that product through a customer-facing presentation has no fixed value. Every time it is delivered to a different audience it will generate a different conversion rate, leading to a different buying conversion outcome, and precipitating a new set of ancillary actions that may lead to additional value.

Although historical data may be used to forecast the eventual buying outcomes, there is no way to determine or control for all of the attributes involved in the delivery of the presentation so that the outcomes achieve the same value. A side conversation among audience members, for instance, that

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occurs in one meeting and not another may increase or decrease the perceived value of a presentation delivery as much as room temperature or an attendee's temperament.

Unlike a production line that uses robots to assemble the same components time-after-time, the delivery of a presentation would, at minimum, include different audience members, with indeterminate initial states, which is enough to make its outcome uncertain.

Looking at a network in the present cannot anticipate either its potential for value or any actual value it may produce

Many organizations find it difficult to forecast revenues or determine the return-on-investment as their businesses, or their business processes, become more non-linear. Organizations that have increased the level of knowledge or relationships in their operational structure or offerings will experience particular difficulties because their accounting practices are not designed to capture the subtleties of the Serendipity Economy. If the only tools available to a financial organization are industrial age tools, then all things will appear to be factories.

This attribute of the Serendipity Economy suggests that while the accumulation of relationships increases the serendipity potential of a network, it does not increase the ability to anticipate or forecast any particular action by the network. The members of the network may, by skewing the accumulation of network members in one field or another, increase the likelihood of the network producing an outcome in one topic area over another, any particular outcome remain unforeseeable.

Consider education, which is a strong model for the Serendipity Economy. The process of teaching is separated from the realization of value by the learner. It may take years for a learner to apply his or her learning to a vocation or to society in general. Assessment of learning, and even more importantly, educator performance, require measurement and instruments that fall outside of the act of teaching or learning.

Yet knowing that schools are not factories, they are nonetheless measured as factories: using completion rates and conferred degrees as key indicators of success, and with specific types of degrees, most recently engineering-related degrees, being described as the most economically viable. And cost pressures viewed through industrial age metrics force education institutions to look to efficiency as a primary method of reform. Thus Texas Governor Perry's October 2011 call for a \$10,000 baccalaureate. These industrial age measures, for instance, lead to standardized tests that assess mathematical competency, but they do nothing to determine the desire, passion or ancillary capabilities of the test taker. Like Six Sigma thinking on a production line, they are instruments put into place to measure quality by eliminating variance from a desired norm along the production route, but they do nothing to measure the overall value of the product being produced. Most importantly, they do nothing to understand the impact of the production act, in this case teaching, on the student. In some cases an emphasis on mathematics, for instance, may inspire and motivate a child with little exposure to it, but on the other hand, some students may find either the topic or the approach too daunting, and turn away from mathematics, ultimately treating it as an obligatory chore.

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Education is a particularly interesting case for the Serendipity Economy because it meets all of the characteristics of the model suggested above, but remains locked in an industrial age measurement setting. Arguments about how to measure educator performance hinge on the inability of policy makers to disengage the production and quality metaphors, and look at education as a more fluid, serendipitous undertaking.

Regardless of an educators approach, no one can predict the future success, careers, earning potential or contributory longevity of any student. Only if the model above is used, and instruments are put into place that accurately measure the learning process as a series of related activities over a long period of time, with certain topics recognized as temporally non-adjacent, does an approach emerge that could model the complexities of the learning environment.

Serendipity may enter at any point in the value web, and it may change the configuration of the value web at any time

In the Serendipity Economy, “value chains” become “value webs.” This means that instead of a linear progression of accumulated value that takes place in a value chain, the Serendipity Economy facilitates the random movement of value between any two connected nodes, in any direction, and in any configuration of succession as long as the nodes are connected. And it does not presume a fixed configuration of the nodes, thus emergent activity may shrink, grow or reconfigure the nodes even during ongoing activities. This means that measurement of a future state could be inconsistent with measurement at the initial state. In the example of the presentation, some of the perceived value of the presentation is related to when people arrive, when they leave, if they return, or how long they are gone, along with the points at which they enter or exist. The network of people in the room is different at different times during the presentation, so any evaluation that does not account for these configuration differences and temporal gaps will fail to capture the complexity of the actual audience behavior.

This spontaneous and emergent configuration of the network further impedes the ability to forecast future value. Value webs are intrinsically dynamic. If value can be accumulated via any back-and-forth connection between nodes, then the addition of a node increases the number of available nodes, resulting in higher serendipity potential. This increases the complexity of the network by $N+$ the number of connections the new node adheres to—and as a non-constant, any initial number of nodes will be as likely to contract as to expand.

A value chain is a subset of a value web that is linear—static for long periods of time and not prone to interruptions. A value chain is purposefully designed to deliver consistent value. The superset of the value web, which includes many non-linear attributes, cannot be optimized and its emergent outcomes do not lend themselves to accurate forecasts of behavior, membership or value delivery.

Productivity, Serendipity and the Knowledge Economy

Many of the principles associated with the definition of the Serendipity Economy also apply to what has come to be known as the *knowledge economy*. The knowledge economy concept was, unfortunately, couched in industrial age terms, such as shifting the means of production from machines to the minds of individuals. Although the knowledge economy is described as people-centric and is usually portrayed as being dynamic, in practice, descriptions often focus on applying industrial age productivity metaphors to knowledge work. Thus engineers are challenged to be productive while derided for not being innovative. As a result, organizations invest in innovation software that facilitates the production and evaluation of ideas, which more often than not, lead to an increased number incremental improvements rather than breakthroughs. The term “Serendipity Economy” was selected for this paper to differentiate this framework from other concepts.

In a recent interview with a large entertainment company, it was the productive aspect of the Serendipity Economy that was most at odds with the industrial age view of performance. The information technology department was asked to turn off the discovery of new ideas. There were so many good ideas that people could not concentrate on delivering their core work, or meeting their objectives. Although the organization conferred permission for idea generation, they failed to account for the complex interactions through time, or loosen other performance metrics so employees could engage with the newly exposed ideas. Their industrial model of performance failed their Serendipity Economy intensions.

Peter Drucker famously struggled with the measures of productivity, finally settling on Total Factor Productivity (TFP) as a proxy for the role of automation and knowledge work (Drucker 1993ⁱ). Unfortunately, his choice seems to have been made more out of fatigue than out of completeness of an answer.

Total Factor Productivity (TFP) calculates growth between two time periods for a production unit as being equal to the net output growth divided by a quantity index of input growth (Jorgenson and Griliches, 1967 and 1972ⁱⁱ). This creates a problem for many non-industrial sectors, such as services, and many for support roles within industrial firms, such as marketing, where the outputs are conceptually difficult to measure. Even in the industrial sectors, large mixes of commodities prove difficult to measure with great accuracy. TFP constrains its model, often creating a one-capital-good world view, which does not reflect the complexity of the world. Given the uncontroverted messiness of economics, economists often choose simplified models in order to perform empirical studies.

No pure science exists that represents the "truth" of economics. Economics exist contextually within the social and political structure under which it is employed. In recent years, several innovations in manufacturing, such as leased labor, leased equipment and outsourcing, have changed the context of the economic models, as has the rise of information technology as a substitute for labor, a facilitator of knowledge transfer, and as a distraction from work attentiveness. None of these issues are sufficiently modeled in TFP to provide any definitive guidanceⁱⁱⁱ to organizations or policy makers. It could be asserted that one of the reasons for the innovations in manufacturing arises from an increase in

serendipitous activity, leading to more uncertainty in production forecasting and thus a need for increasingly agile models to compensate for the lack of foresight.

Although this paper does not tackle the Cambridge Controversy (Stiglitz, 1974)^{iv}, which for a number of economists describes problems with TFP leading to their rejection of neoclassical economics — it does suggest that abstraction is not the answer, leading to a more realistic representation of production and value. The Serendipity Economy framework is intended to sit alongside and to supplement and complement existing frameworks.

In order to effectively understand knowledge work, it must be deconstructed from the industrial matrix in which it is held. As Oxley and Walker^v point out in their excellent exploration of the issues of knowledge economy theory, so much of our language for understanding firms, and almost all of our measurement systems, derive from theories that fail to model individual knowledge work, and its aggregation in firms and national economies. The mix of terms used to describe a knowledge economy, and the divergent approaches to measurement, have real consequences for policy and economic development.

It is important that we understand what is intended by "knowledge work" and "knowledge economy." Deconstructing knowledge work reveals several distinctions that differentiate it from production work. First, knowledge work usually produces a result that is separated in time from any production work associated with it. Neoclassical theory suggests that production and consumption be separated in time (Jorgenson and Griliches 1972^{vi}) but this does not account for feedback loops, such as those associated with market quality, brand equity, consumer reaction or other attributes that may have meaningful bearing on the quantity or mix of production. Further, the performance of pure knowledge work (education, consulting, and medicine) always experiences a delay, often a significant delay, between the preparation and conveyance of knowledge, and the realization of value.

Productivity continues to offer value for productive endeavors, but it must be redefined for the Serendipity Economy. Productivity in the Serendipity Economy must focus on efficiency of network creation (increasing serendipity potential,) as well as the identification and forced awareness of people or ideas that would lead a serendipitous act.

Reputation is one factor likely influences serendipitous activity as an element of trust. Research demonstrates a relationship between reputation and the collection of information. Conveyed and produced information reinforces perceived power within an organization (Ahituv and Carmi, 2007^{vii}), suggesting that reputation value is derived from the existence of knowledge by individuals and functions, not always directly from its creation. Reputation then, as expressed in perceived power, can be seen as delayed in time from the production or acquisition of knowledge. Ahituv and Carmi go on to say that the role of IT in this perception of power is "attributed to a number of dimensions, some of which are quite latent and hard to measure."^{viii} These "latent and hard to measure" dimensions may be related to the time delays and high level of abstraction for representing relationships and relationships

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to time. They very constraint to be “productive researchers” may focus research more on discrete events than holistic systems.

Reputation includes both the time delay (you don't instantly become an expert—a person's reputation grows as a function of his or her advice proving useful – thus, consultants working for large firms play off the reputation of the firm rather than their own reputation) and network expansion through information accrual. The quality of a reputation also follows the premise that external factors assess its attributes. Reputation is not something the owner can produce, it is something conferred upon the person or firm by external assessment. By doing what they do well, people gain a positive reputation that is discovered through serendipity by their network of associations.

Reputation is a double-edged sword. Rajan and Zingales propose firms must maintain their reputation in order to attract talent. As individuals create personal brands through their accumulation of knowledge, the power of the firm shifts to individuals, and thus management must find ways to make the firm attractive to talent. One way this is accomplished is by ensuring that "work is enriching, that responsibilities are handed down, and rich bonds develop among workers and between themselves and workers.^{ix}" In other words, the diminished authority of management requires nurturing social networks and recognizing the effects of the Serendipity Economy to entice their staff members to turn those networks toward employment opportunities, rather than solving problems for clients.

Although the extensive survey of knowledge economy theory remains to be officially published, Les Oxley, Paul Walker et al, of the University of Christchurch, New Zealand have drawn a sharp focus on the failures of current economics to accurately reflect the burgeoning knowledge economy, though even in this paper TFP remains an unchallenged alternative to the issue of the impact of Information and Communication Technologies (ICT) on productivity (Oxley, Walker 2008:P 39).

Their conclusion, however, describes the need for new views of economics:

We are left with an unsatisfactory model of the (knowledge) firm and thus we are unable to give guidance on either empirical or policy questions that flow, via changes to the firm, from the development of the knowledge economy. Firm's organizational structures are changing in response to the increased prominence of information and knowledge in the production process. In the new economy, not only will we see changes in the location of production, but even if production still takes place within a traditional firm, a factory or an office, that firm may have a very different structure and organization from the one we see today. (Oxley, Walker 2008:P 36)

Perhaps one of the most fundamental issues with productivity measures comes from their inability to capture results that extend over long periods of time. Productivity does not measure the building of capacity or view creating capability as positive attributes because it is completely separate from any forward looking investments. Depending on what is being modeled, the latent realization of value in the Serendipity Economy purposefully attempts to recognize the accumulation of knowledge and reputation through measurement intended to assess the perceived increase of those attributes over time.

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The Serendipity Economy construct creates a framework in which the delays of time can be accounted for, and the outcome value determined through external observation. This can be seen as an extrapolation of an idea suggested by Peter Drucker^x that all firm values are determined outside of organizations.

The Role of Technology in the Serendipity Economy

In the measure of productivity, technology is seen as the primary means of sustained productivity improvement. Many factors, including people working longer hours, or organizations using their capital equipment outside of its normal operating hours, like adding extra shifts, creates a false indicator of productivity improvement that clouds the impact of technology. In *Productivity Growth in the 1990s: Technology, Utilization, or Adjustment* (NBER Working Paper No. 8359)^{xi}, authors Susanto Basu, John Fernald, and Matthew Shapiro argue that it was indeed technology, and not these other spurious factors that led to the productivity increases of the 1990s. The problem is, this kind of work looks at productivity alone, and no matter how broadly one defines productivity, it remains essentially an industrial age analysis where inputs and outputs are correlated to fixed times. Since the Serendipity Economy disconnects productivity gains from value, it forces organizations to look beyond just doing things better, but doing better things.

Applying productivity improvements to processes that do not matter can contribute to, and even accelerate the demise of organizations.

BusinessWeek reported in 2007 that innovation giant 3M was suffering a demise in creativity based on the over application of process improvements and Six Sigma investments^{xii}:

Efficiency programs such as Six Sigma are designed to identify problems in work processes—and then use rigorous measurement to reduce variation and eliminate defects. When these types of initiatives become ingrained in a company's culture, as they did at 3M, creativity can easily get squelched. After all, a breakthrough innovation is something that challenges existing procedures and norms.

Services, as well as manufacturers fall into the trap of over applying industrial age process improvement techniques to non-industrial issues. Productivity in services can be improved by few, more high-valued activities, thus increasing labor and capital utilization toward bigger returns. But because the Serendipity Economy theory posits that you can't forecast outcomes, it would be difficult to argue that putting a higher percentage of resources behind a particular initiative would result in a better outcome.

In the Serendipity Economy, rather than being a replacement for human labor, technology acts as a facilitator of serendipitous activity along two dimensions: expansion and compression.

Technology compresses the paths among potential collaborators. The enterprise and its affiliated partnerships of contractors and suppliers is a network, and if that network has no technology foundation, then meetings, walking around and flying to other locations would be the primary means of

discovering new connections. Technology, from telephones to social media, aids in the discovery of people who might prove valuable additions to the network. What specific value these new network members might contribute cannot be determined.

Technology also compresses time and distance by allowing members of the network to traverse quickly, without regard to geographical distribution, leading to what might be seen as a productivity measure, but the “productivity of the network,” its activity, as no specific, repeatable output so the traffic itself cannot be “productive.” The traffic, however, could be seen as a compression of time that facilitates an increase in interactions, thus increasing the overall serendipity potential of the network.

The expansion and compression mechanisms within the Serendipity Economy need to be contrasted with productivity improvements where compression dominates, often through the exchange of labor. In the Serendipity Economy, compression focuses on network efficiency as a way of increasing the number of encounters, but it cannot, based on the principles in this paper, offer any forecast about the value of those encounters, whereas compressing a process to use fewer resources to produce the same or higher output always results in a measured performance improvement.

Although some serendipitous encounters may be meaningless, some may be of great value, but until the encounter occurs, and until the parties involved in the encounter decide to pursue and assess value, no value exists. The network is filled with potential, and technology offers a way of realizing the potential, but unlike some productive work where robots, with few or any humans can independently produce products for extended periods of time, the serendipity economy cannot realize its potential through the application of technology alone.

Conclusion and Recommendations

The Serendipity Economy ultimately offers a new perspective on activity that everyone participates in, but few use to measure their value. In a world driven by either ideology or evidence-based approaches, a notion like the Serendipity Economy is difficult to embrace because it neither predicts short-term results nor pretends to offer long-term revelation. What it does do is ask organizations and individuals to recognize that value from people, from technology and from processes can arise in surprising and unanticipated ways.

As the Internet connects more people, the increase in accidental contact creates ever greater incidences of unanticipated value creation. The very value of a social network is to increase the synergies among its members and compress the ability to add nodes to the network and to drive information through the network to create, discover or disseminate value. With well over 2-Billion people on the Internet^{xiii}, the value generated by serendipity will become too large to ignore.

Consider places like Silicon Valley that offer a serendipitous context as place. The idea of Silicon Valley and the relationships built there facilitate serendipitous economic activity in the same way social media does on a more global scale. Although social networks have existed since the beginnings of civilization,

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the advent of industrial age economics eliminated them from its models, opting for linear views of the world that depersonalize and abstract human roles in favor of models that could be optimized.

We live in an era of great cognitive dissonance where the way we represent work is often in stark contrast to the way we actually work. Hierarchies and linear processes do not capture the complex interactions of people creating value outside of factory settings. We attempt to overlay these industrial age models on non-industrial age work, resulting in a workforce that is disengaged and frustrated.

Revisit education. The ongoing effort to better measure educator performance has been met by many educators and teachers unions with great resistance. Why? An educator's performance cannot be measured strictly in terms of the speed and efficiency with which knowledge is transferred in order to meet the objectives of standardized tests. Education creates serendipitous associations that generate value that cannot be assessed through standardized tests. The value generated by the education experience may well exceed any curriculum-based record of a learner's achievements or struggles, because education is holistic, creating value through direct and indirect learning. Only the areas assessed, and those paid attention to, become part of the record. The outcome of such a complex, multi-year experience, cannot be determined, regardless of the complexity of the model used to describe it. It is not until students enter into society and start contributing to it, that the value of their education can be determined—further, that entry into society cascades into an entirely new set of serendipitous events. In some ancient cultures, the primary value of an educator derived not from the immediate proof that learning took place, but by the standing of former students in society.

The idea of the Serendipity Economy suggests that organizations recognize where and when industrial age models are incongruous with the mode of work, and that they look to longer-term views of value and to new instruments for determining the outcome of knowledge work.

Such a view actively challenges many of the underlying fundamentals of markets that reinforce short-term views and seek stability and predictability when those two attributes may be more an example of magical thinking than reflections of real economics.

The only meaningful way forward is to embrace uncertainty and create a view of economics that represents value creation under uncertainty. The Serendipity Economy attempts to put forth a sketch of such a system. By acknowledging the disconnection between creation and value realization, the need for external validation of value, the variability in perceived value and the inability to forecast or anticipate value from a network, the Serendipity Economy framework offers a more realistic, albeit more difficult to instrument, representation of the work conducted by an increasing percentage of today's workforce.

Mansell and When^{xiv} point out that "In today's institutional governance system any country that tries to strengthen its national information infrastructure must do so in close interdependence with the global environment". It is imperative that economists and industry cooperate to create more holistic measures of performance. Continuing to overlay industrial age measures on knowledge work is a dangerous activity that will eventually lead to major disruptions as markets and systems realign to compensate for the artificial constraints that attempt to describe and govern them—and the burgeoning Serendipity

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Economy will continue to falter as organizations and economies measure moment-by-moment tasks, rather than the outcomes of aspirations. Only by recognizing that we now live in a global Serendipity Economy can we accurately engage with, and account for, the often chaotic manner in which new value emerges, and the long time that it often takes for investments to mature.

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About the Author

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