Serendipity and Grounded Theory: a Possible Dialogue in Hawthorne's Scenario

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Abstract

The purpose of this essay is to present a brief discussion on the emergence of the Human Relations Theory as serendipity or grounded theory. For the theoretical framework, I present topics about serendipity and grounded theory, on theory and substantive theory, followed by the core of the essay, a discussion of the studies taken place at Western Electric Company's Hawthorne Works in Chicago, which gave rise to the focus on human relations. One can conclude that social factors that emerged in Hawthorne's scenario were not being sought out; they were serendipitous discoveries, based on data, as recommended by grounded theory.

Introduction

Everything existing in the Universe is the fruit of chance and necessity
Democritus

The science developed in ancient Greece, replacing mythology and assuming a key role in building the body of explanatory knowledge about the existence and role of man in the world. According to Russell (2001, p. 13), "in the short space of two centuries the Greeks produced art, literature, science and philosophy an astonishing outpouring of masterpieces which established the general standards for Western civilization." According to Solis (1990), on the solid and objective basis bequeathed by the Greeks, the current patterns of science emerged during the Renaissance period, which is corroborated by Morin (2000, p. 9). Modern science could only emerge in the cultural effervescence of the Renaissance, in the economic, political and cultural effervescence of Western Europe in the sixteenth and seventeenth centuries.

Since then, it gradually associated itself with the technique, becoming techno science, and was progressively introduced into the heart of universities, societies, companies, States, transforming them and being transformed, in turn, by what it transformed. Koyré (2011, p. 43), however, disagrees and states that "to speak of scientific contribution of the Renaissance may seem a paradox or even foolhardy." The author believes that the Renaissance inspiration was not scientific, but of literature and the arts, a rhetoric ideal and that its contribution to science was solely the destruction of Aristotelian synthesis. Modern science was born with Galileo and grounded in the methodological principles proposed by him: observation of phenomena as they occur, experimentation and mathematical regularity (Solis, 1990). However, many were the times that despite strictly complying with the scientific method, many studies found unexpected results. Roberts (1989) accounts for hundreds of causal findings in science, whether with pure research, such as the proposition of the molecular structure of benzene by Kekulé and acetylcholine of Loewi, or with daily products such as Teflon, Velcro, nylon and different types of plastic, or in medicine, such as penicillin, vaccines, anesthesia, X-rays, and even the microscope. These apparently chance findings are denominated serendipity or serendipitous discoveries.

As qualitative methodology, which uses the inductive process, grounded theory proposes that research begin "with an area of study and allow for the theory to emerge from the data" (Strauss, Corbin, 2008), ie, the researcher should enter the field without a defined research question (Glaser, 1992) and, accordingly, his findings could be considered serendipitous, considering that they were not being sought. In nature sciences and in exact sciences, serendipitous discoveries are common (Roberts, 1989), but in the social sciences, especially in management science, they are much rarer. It is possible that in the disciplinary field of sociology, they were first cited by Merton (1970), when he presented the expression of serendipity pattern. Based on these statements, one may consider that the importance of informal organization was a serendipitous discovery, considering that it was not being searched for, it was identified by chance. Therefore, the goal of this essay is to present a brief discussion on the emergence of the Human Relations Theory as a serendipitous discovery or as a result of grounded theory process. It is important to point out that the essay offers a reflective and interpretive nature, guided by questions that lead the reader to deep reflections (Meneghetti, 2011), that is, the aesthetic of the essay has its own nuances (Benjamin, 1994). Topics about serendipity, grounded theory and substantive theory will be presented, followed by the core of the essay, discussion regarding the Human Relations Theory being grounded on data. Lastly, the conclusions and references will be presented.

Serendipity and Grounded Theory: are we speaking about the same thing?

In the field of observation,
Chance favors only the prepared mind.
Louis Pasteur

A difficult word to translate into Portuguese, Amorim da Costa (1986), corroborated by Merton and Barber (2004), states that the word serendipity has a known origin and can be dated with precision: it was proposed by Horace Walpole in 1754, when referring to luck of casually finding an old painting. This discovery indeed is almost of that kind which I call serendipity, a very expressive word, which as I have nothing better to tell you, I shall endeavor to explain to you: I once read a silly fairy tale called The Three Princes of Serendip: as their highnesses travelled, they were always making discoveries, by accident and sagacity, of things which they were not in quest of [...] (Walpole cited by Vale; Delfino; Vale, 2005, p. 225). Vale et al. (2005, p. 206) define serendipity as "a happy reunion for the researcher who his mind prepared for understanding a new framework and from it establish consistent deductions." Far from any kind of "methodological anarchism" (Haguette, 2001), serendipitous discoveries should not and cannot dispense with centuries of scientific practice. Without the intention of denying the severity of the method, unexpected or inter current occurrences of random chance may arise in the development of any research protocol (Vale et al., 2005). Merton (1970) teaches that to apprehend one serendipitous discovery, one need to impose a methodical attention to an unexpected fact.

According to Popper (1993), no method leads to the construction of good theories, there is only the general experimentation and changes in direction and the findings may even be products of chance, which also confirms the role of serendipity in social science. Beveridge (1981, p. 20) believes that there are three types of casual discoveries: intuition, from the juxtaposition of ideas (inspiration, insight, etc.); eureka type intuition (*eureka!*) and serendipity (happy accidental discovery).

Not always well accepted by the scientific community, it is important to emphasize that intuition "not only contributes to the invention, but also to epistemological control in that, if controlled, it will draw attention of sociological research to ambition to restore the inter-relationships that define the totality of what is built"(Bourdieu; Chamboredon; Passeron, 1999, p. 75). The serendipitous researcher, according to Vale et al. (2005, p. 226), "must possess characteristics such as curiosity, patience, commitment, organization, stubbornness, ie, capacity for insight in the right place, at the right time, and a lot of perspiration and inspiration." The serendipity element of research occurs when the researcher arrives by "chance or sagacity, of valid results which were not sought for. This develops into a capacity to 'see' what other cannot see, to observe an unexpected, anomalous and strategic element that may bring a new 'fact' for developing a new theory or for extending an existing theory (Merton, 1970, p. 173,quotes as the original). To find out what is not being sought, one should observe "sensory clues and the connections established among seemingly disparate and far away elements, all requiring patience, sensitivity and time, time to unlearn automated theories and thoughts, including those coming clothed with authority"(Velho, 2006, p. 11). So serendipitousdiscoveries may point to the advent of a new paradigm, using Kuhn's (2005) understanding of a set of universally recognized scientific knowledge for determining period of time.

In the social sciences field, serendipitous discoveries are rare. However, a type of qualitative methodology that may provide such a discovery would be the grounded theory, considered by Charmaz (2009) as a method for studying processes, a method in process. In the taxonomy proposed by Merriam (1998), grounded theory is one of five types of qualitative research. In this approach the fundamental concern is with "the universe of meanings, motives, aspirations, beliefs, values and attitudes, which correspond to a deeper place of relationships, of processes and phenomena that cannot be reduced to the operationalization of variables" (Minayo, 2004, p. 22). Tesch (1990, p. 20) subdivides the qualitative methods into two types, according to the analysis of regularities. In the first type are the methodologies that are "subject to clarification and categorization of elements, followed by the exploration of their relationships (theory elaboration)." There is inserted grounded theory, an approach of Miles and Huberman, ethnographic content analysis, structural analysis of the events and the ecological approach. Demo (1995, p. 14) states that "in building social sciences, one does not aim at finished products, definitive truths, but to cultivate a creative process marked by conscious dialogue with the social reality." Grounded theory is derived from data and "tends to look more like the reality than with derivative theory from combining a number of concepts based on experience or solely through speculation (of how one thinks how things should work)" (Strauss, Corbin, 2008, p. 25).The object of grounded theory is "building empirically grounded theories from social phenomena in respect of the few analyses that have been articulated. It arose in reaction to the theoretical speculation divorced from any reference to reality" (Laperriere, 2012, p. 354).

Bourdieu, Chamboredon and Passeron (1999) warn against the risk of not explicitly formulating a set of hypotheses based on a theory, because one runs the risk of researching as social subject and not as a social scientist. In this sense , due to the dangerous proximity between science and the object of study, the epistemological ruptures proposed by Bachelard (2002) and Santos (1989) , are "more often professed carried out" (Bourdieu; Chamboredon; Passeron, 1999, p. 36).The foundations of grounded theory were laid by Glaser and Strauss in 1967, in the book The Discovery of Grounded Theory, which opposed the dominant methodological assumptions at the time (Charmaz, 2009). There was a predominance of quantitative methods and qualitative research was still criticized as soft science, its researcheroften seen as a journalist, social critic, artist, quilt maker, essayist, ie, a *bricoleur* (Denzin, Lincoln, 2006).

These criticisms can be disputed from from Silverman's (2009, p. 21, as quoted in the original) statements that "both science and everyday life teach us that there is no 'right' no method, it all depends on what one is trying to get", Minayo and Sanches (1993, p. 239) , when they teach that" a good method will be one that allows the correct construction of the data, helping to reflect on the dynamics of the theory" and Feyerabend (1977, p. 279) when he states that "there is only one rule that is valid in all circumstances, nor a single instance which can appealed to in all situations." Charmaz (2009, p. 22) identifies a rupture between Glaser and Strauss in 1978, when they began to "consider the theory as based on the relatively divergent directions", opposed in their emphasis on the construction of reality (objective versus subjective) (Burrell; Morgan, 1994). According to Mendonça et al. (2013, p. 190), "Barney Glaser insisted on an objectivist perspective (e.g., Glaser, 1992), while Anselm Strauss, inspired by the tradition of the Chicago School, emphasized the constitution of reality from action." The constructivist grounded theory was developed from the latter.

Constructivism considers "social reality as being constructed in different ways in different contexts" (Silverman, 2009, p. 22). It is based on four pillars: the language, the skeptics, the concept of evolution, and cybernetics, being understood as a way of thinking, as a hypothetical model that aims to describe the phenomena of experience. For constructivists, "knowledge has to be viable, to suit our purposes. It has to fulfill a function. For example, ithas to fit into the world as we see it, and not how the world should be" (Foerster, 1996, p.83). Similarly, Knorr-Cetina (1981, p. 5) indicates that the products of scientific practice "are contextually specific constructions that have characterized the contingent situation and interest structure to the process by which they were generated". For the author, the scientific production is always contextual and contingent, which reinforces the Hegenberg assertion that "scientific research does not take place in an intellectual vacuum (1973, p.33). Quite the contrary, research is always steeped in a context". According to Berger and Luckmann (2004, p. 34), "a proper understanding of the *sui generis* reality of society, requires the investigation of the manner in which this reality is constructed", which emphasizes the notion of process, fundamental concept in the grounded theory methodology. Strauss and Corbin (2008) emphasized the constructivist orientation of research, and also the role of prior knowledge of the researcher.

Bandeira-de-Mello and Cunha (2006) indicated that during the development of grounded theory occurs the inclusion of multiple realities and complexities of a particular world, and one notices the development of the theory is dependent on the researcher's point-of-view, who learns about the subject by living the experience. Mills, Bonner and Francis (2006) propose a constructivist "spiral" in the development of grounded theory, pointing to the importance of building from a field. Corroborating, Flick (2004) teaches that the researcher should adopt a constructive attitude on the field, including the context in his analysis. According to Charmaz (2009, p. 246), "a reasonable constructivist theory retains the fluidity and unrestricted character of pragmatism as evidenced in the works of Strauss, as well as those influenced by him". The author further states that to maintain a constructivist sensibility, one may understand and interpret the nuances of meaning and action, as well as being aware of the interactive and emergent nature of the data and the analysis (Charmaz, 2009). Grounded theory emphasizes the data, thus being considered as a substantive theory, because it addresses "delimited problems in specific substantive areas" (Charmaz, 2009, p. 22).

Substantive Theory

Only those seeds that fall on good soil grow.
Mark, 4:8

Morin (1962, p. 33) states that "there are words that become too heavy, that end up being crushed by their own content and, by having everything explained, require an explanation." One of these words is 'theory', which is corroborated by Homans (1999), who points out that, in the social sciences, no word is used more than 'theory'. Similarly, Rudner (1976, p. 26, as quoted in the original) believes that "there are few terms in the scientific lexicon whose use, both by scientists and non-scientists, has been so long in such an anarchic state as the word 'theory'. [...] 'theory' is used in various manners – many of them futile".Widely used word, only recently have people begun to realize that the concept is not entirely appropriate for the subject matter of the social sciences, although it is important to point out that "without a constant pressure for the construction of theories, the field certainly would slip to its natural resting place in the arid land of empiricism" (Sutton; Staw, 2003, p.81).

Bruyne, Herman and Schoutheete (1977, p. 102) point out that theories establish "a body of systematic and autonomous statements, in a language with its own rules and its own dynamics that give it fertility". In this sense, one can consider that theory is the most powerful tool of epistemological rupture front of the preconceived notions of common sense (Bachelard, 2002; Santos, 1989). Thus, theory is "a speculative building spirit that binds the consequences to principles,be it by opposition to practice, in the order of events, or the normative order; as opposed to common knowledge; as opposed to the certain knowledge (Lalande1999, pp. 1127-1128). In a metaphorical definition, "theories are nets, cast to catch what we call 'the world': to rationalize it, explain it, master it. Our efforts are towards making the meshes of the nets increasingly closer"(Popper, 1993, p. 161). According to Chalmers (1993, p. 23), "scientific theories are derived in a rigorous way of obtaining data of the experience acquired by observation and experiment. Science is based on what we see, hear, touch, etc. Opinions or personal preferences and assumptions have no place in science". Glaser and Strauss (1975) support this position and question the need for a theory or theoretical problem that precedes the approach of reality, because it stifles creativity and the discovery of new theories.

In this sense, grounded theory "seeks, first, *the elaboration of a theory*, certainly rooted in empirical reality, but it does not constitute a description; empirically observed cases are not regarded in of themselves, but as *instances* of observed social phenomena" (Laperrière, 2012 , p. 353, italics as in the original). Thus, Strauss and Corbin (2008) teach that the theories can be formal or substantial (substantive). Formal theories "consist of an interrogative mode for explaining a process, are comprehensive and compound, apply to a broader scope of concerns and disciplinary problems, emerge from studying the phenomenon, examined under different kinds of situations" (Soares; Erdmann, 2013, p. 31).

While the formal theory is more general and applies to a broader range of problems, substantive theory is specific to a particular group or situation and does not aim to generalize beyond its substantive area (Strauss; Corbin, 2008). A substantive theory must be able to explain a phenomenon which, identified in the data, emerges as relevant to those involved (Bandeira-de-Mello; Cunha, 2004). For Mendonça et al. (2013, p. 190), grounded theory is "a tool for localized theoretical development, in order to focus on local studies (within a substantive area of research) and try to develop theories that provide support for understanding the situation". As methodology for generating theories about phenomena, grounded theory has been gaining importance in all fields of knowledge, especially in administrative science that, as a rule, imports North American and European theories, dissociated from the local context.

The Hawthorne scenario: serendipity and the theory emerging from the data

To see what other has seen and think what other have not thought of.
Albert Szent-Györgyi

The research that led to Hawthorne's studies, consisting of several experiments, was led by George Elton Mayo, it began in 1924 and was completed in 1932, at the Western Electric Company's Hawthorne Works in Chicago. Its initial objective was "to study the relationship between worker efficiency and lighting in the workplace" (Cordeiro, 1979, p. 80). The research protocol was clear (Vale et al., 2005) and its development began with the choice of the experimental and control groups, to test the influence of the independent variable (lighting) on the dependent variable (worker efficiency or productivity). The hypothesis stated that there was a direct relationship between the intensity of illumination and the efficiency of employees, measured by output (Homans, 1979). According to Roethlisberger and Dickson (1939), better lighting cause an increase in productivity. At this early stage, it is evident that the research was based on an existing theory, Scientific Management (Taylor, 1990), which, at the time, contradicts the methodology of grounded theory as proposed by Glaser and Strauss (1975), since they question the requirement of a theory or a theoretical problem that precedes the approach of the real. The experiment began with the division of the employees into two groups who performed the same task under the same conditions and had been chosen because they presented similar levels of productivity. The experimental group worked under variable light intensity, while the control group performed the task under constant illumination (Homans, 1979).

The expectation of presenting a direct relationship between the variation of light intensity and productivity was not effective. The worst thing that could have happened, occurred to the researchers in the experiment, the hypothesis was not confirmed nor denied because it was observed that productivity was increasing in both groups. It was expected that only in the experimental group this increase would occur, in the control group, productivity should be stable. This disturbing result or unexpected occurrence showed that there was no direct relationship between the two variables. It became a challenge to identify what was causing the surge in productivity in both groups and the search continued for a few years, making use of different types of experiments. The researchers involved had to try to understand the new framework for consistent deductions (Vale et al., 2005), because the theory of Scientific Management did not offer help to explain this result. One may then consider that there was, in line with Vale et al. (2005), an unexpected or undercurrent occurrence of random chance. The goal then became to identify what was causing increasing productivity both in the control group and in the experimental group, that even with the reduced lighting continued with increasing production (Roethlisberger; Dickson, 1939).

A new experiment was conducted in order to identify the nature of the unknown factor (Brown, 1954). Six employees were selected to assemble parts for telephones, a task performed in a special room in the presence of a researcher who wrote down everything that happened, giving opinions on the development of the work and listening to complaints. The objective of this new experiment was to identify the influence of rest breaks in production (Roethlisberger; Dickson, 1939). So far, it is still evident the theoretical basis of Scientific Management, with the study of time and motion.

In this experiment, working 48 hours a week, under normal conditions, without rest breaks, each producing 2,400 pieces per week (Brown, 1954). In the study, two mandatory rest breaks were given, five minutes on each shift (morning and afternoon). Production increased. The breaks became of 10 minutes and production continued increasing. Then six five-minute breaks are introduced and in this system, production falls. A returns to the previous system and a meal is introduced, production increases again. The workday is reduced in 30 minutes, production increases further still. Another 30 minutes are decreased from the workday, production remains unchanged. Saturday becomes a day off, production increases again, reaching 3,000 parts. After cancelling all concessions, intervals, reduced workweek, removal of the meal and restoring the 'normal' workday in the group who participated in the experiment, production continued higher than the overall rate of the factory (Roethlisberger; Dickson, 1939). Based on the obtained data, it was concluded that "[...] there was no evidence to confirm the hypothesis that the increased rate of return [...] was caused by the reduction of fatigue" (Roethlisberger; Dickson, 1939 p. 127). The next experiment was conducted at the Electrical Installations of Series Room and aimed to verify the influence of economic factors on the rate of production because, as advocated by the theory of Scientific Management, payment should be made by item produced.

The researchers had already realized that workers produced much less than they were physically capable of, following a determination made between colleagues. Regardless of how much more they could receive, conformed to what the researchers called artificial restriction of output, in contrast to producing what was physically possible (Etzioni, 1980). These unexpected discoveries occurred in all experiments, forcing the researchers to a methodical and rigorous attention in order to identify the factors that were interfering in the results (Merton, 1970). It was necessary to establish connections with patience and sensitivity, unlearn theories and automated thoughts, as taught by Velho (2006), even those coated with authority, the principles proposed by Scientific Management. It was the moment that the characteristics identified by Vale et al. (2005), such as a curiosity, patience, commitment, organization, stubbornness and ability for insight, needed to emerge in order to identify the anomalous element, for probably a new theory emerging (Merton, 1970). They needed to identify the phenomenon that was interfering with the expected results and this could only happen from field observations (Mills; Bonner, Francis, 2006), based on the analysis of reality.

Knorr-Cetina (1981) points out that the products of scientific practice are contextually specific constructs and the context of experiments indicate that the phenomena were not related to the variables initially proposed in the research protocol. It was necessary to identify what the data was showing, checking carefully the context in which they were occurring. To find the serendipitous element, constructivist sensitivity is required to interpret the nuances of meaning and action, as well as being aware of the interactive and emergent nature of the data and its analyses (Charmaz, 2009). It was then necessary to identify the phenomena that were present in the experimental and control groups that were not being sought. Then came the social factors, ie, the increase of production was the result of the social situation of workers and the attention that was being given to them, such as the presence of the researcher in the group, making the subjects feel valued, informality that characterized the physical environment of the experiment, and the development of a sense of belonging to a group. From this emerged the Human Relations Theory and the results and conclusions, based on data, were that production is influenced by social norms, non-economic rewards significantly influence behavior, workers act and react as members of a group, and the role of informal leadership (Etzioni, 1980). As a serendipitous discovery, the informal organization emerged, never before having been an object of study in management. Until the results of the Hawthorne experiments, the social factors in the organization were ignored, following from this a great difficulty in identifying them. It can be stated that they were not being sought, they strongly emerged from the data, delimited in specific substantive areas (Charmaz, 2009), theywere serendipitous discoveries.

Final Considerations

[...] the real is not in leaving or in arriving: it shows itself to us in the middle of the crossing.
João Guimarães Rosa

Organizational science is a social science because organizations are always made up of people, even though until the Hawthorne studies, they were not the object of study. In the Scientific Management theory there was a predominance of quantitative methods, but the new theory that emerged from the data required the type of analysis proposed by the qualitative approach, for it demanded a deep understanding of relationships, of processes and of phenomena that, as pointed out by Minayo (2004), cannot be reduced to the operationalization of variables such as lighting and control of time and movements.

With the Hawthorne studies, emerged a new and unknown phenomenon for which researchers could find no explanation, even if rigorously following research protocol. It was necessary to carry out a series of studies to identify what was happening in the research environment because the results "cast doubts, one by one, on all the statements of classical authors, according to which there was a simple and direct relationship between physical working conditions and production rate" (Etzioni, 1980, p. 55).

The importance of the informal organization was a serendipitous discovery, considering that it was not being sought, and was identified by chance. It also emerged rooted in empirical reality, when researchers made the meshes of the net increasingly closer (Popper, 1991). From the Hawthorne studies, there was a change of direction in relation to Scientific Management, with discoveries that were products of luck, found by chance, with valid results that were not explicitly sought (Merton, 1970).

Grounded theory is derived from the data and, in this sense, it can be concluded that the findings of the Human Relations theory fall under the methodological principles proposed by Strauss and Corbin (2008), and there also was the presence of the serendipity element, because the researchers were not looking for the meaning and the importance of social factors in the organization. These emerged from the data, as a fortuitous discovery. The results questioned all statements of classical authors, because no simple and direct relationship was found between the physical working conditions and productivity. The Hawthorne serendipitous discoveries were the basis on which not only the Human Relations theory was developed, but also future studies on human behavior in organizations. There was, according to Kuhn (2005), the advent of a new paradigm. This essay is concluded by noting that the Cartesian and linear vision is necessary but not sufficient for the development of science, for numerous scientific discoveries are the result of chance, which can interfere and alter the expected results, enabling the advent of new paradigms and growth of scientific knowledge.

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