TREND RESEARCH & ARTIFICIAL INTELLIGENCE: the case of the company Coleção.Moda

ESTUDOS DE TENDÊNCIAS & INTELIGÊNCIA ARTIFICIAL: um estudo de caso da empresa Coleção.Moda

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ABSTRACT

The transformations after the first Industrial Revolution continue to echo in society, resulting in advances in technology, production and consumption of products in different segments. Therefore, the objective of this article is to carry out an elucidative study of the company Coleção. Moda, which uses Artificial Intelligence (AI) to carry out trend research, problematizing the influences of industry 4.0 on the fashion industry. In methodological steps, it uses the bibliographic review and semi-structured interview to reflect on the case of this company that analyzes patterns of repetitions in photographs of catwalks of fashion shows via AI to map the rise of trends in the sector. Finally, it is worth mentioning that the company has adapted and innovated the research process by using AI and that it concentrates its analysis efforts on the main fashion shows worldwide as research sources.
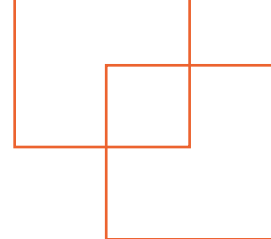
KEYWORDS

Trend research. Industry 4.0. Artificial intelligence. AI.

RESUMO

As transformações pós primeira Revolução Industrial seguem ecoando na sociedade, resultando em avanços na área de tecnologia, produção e consumo de produtos em diferentes segmentos. Logo, o objetivo deste artigo é realizar um estudo elucidativo da empresa Coleção.Moda que se vale da Inteligência Artificial (IA) para realizar a pesquisa de tendência, problematizando as influências da indústria 4.0 sobre a indústria da moda. Em passos metodológicos, vale-se da revisão bibliográfica e entrevista semiestruturada para refletir sobre o caso desta empresa que analisa padrões de repetições nas fotografias de passarelas de desfiles de moda via IA para mapear a ascensão de tendências no setor. Por fim, destaca-se que a empresa adaptou e inovou o processo de pesquisa ao utilizar IA e que concentra seus esforços de análise para os principais desfiles mundiais como fontes de pesquisa.

PALAVRAS-CHAVE

Pesquisa de tendências. Indústria 4.0. Inteligência artificial. IA.
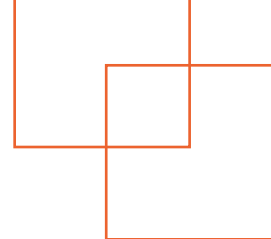
1 INTRODUCTION

Since the first technological changes, mapped as the first Industrial Revolution, many changes have resonated in our society until today. Changes in production chains, new logics of distribution, consumption and disposal of goods corroborate the construction of a narrative that describes the period between industry 1.0 to today, showing how different segments are adapting according technological innovations, including the area of fashion.

The fashion industry, historically influenced by social changes, once again needs to make an effort to absorb the main changes that are happening and to update itself in terms of market demands, technology supply, use of information on consumer buying behavior, among other possibilities. Because of the above, this article discusses the influences of industry 4.0 on companies that perform trend research for the fashion sector, specifically the use of Artificial Intelligence (AI) for this purpose. In this sense, the aim is to conduct a study of the company Coleção.Moda to understand the influences that this technology exerts on this service - as a telling example, since this company uses the AI to deliver reports indicating trends for its customers from the analysis of the shows of the main world fashion weeks.

As a central theme of research, there is an understanding of how the fashion industry is being transformed by technology on an exponential scale in the emergence of automated processes, manufacturing, big data, artificial intelligence and replacement of human labor by machines. Therefore, considering so many changes, one seeks to understand how the practice of trend research, done until then by the collection and analysis of purely human signals, using technology only as a tool to access information, is being carried out in a company that uses artificial intelligence as a means to achieve mapping similar to those mentioned above.

In a methodological design, the research is applied, with descriptive character and anchored in the methodology of bibliographic review of the concepts of trend research, industry 4.0 and AI; semi-structured interview with the owner of the company and qualitative analysis of the data, articulating them with the revised concepts. Finally, it is inferred that the use of AI by Coleção.Moda corroborates for trend research in different ways, demonstrating that this industry already shows the first signs of fusion with the fourth Industrial Revolution.

Finally, it is emphasized that this research gains importance, since the conceptualization, use and relevance of new technologies by the fashion

and clothing market is problematized, improving the understanding of the future of the work for different professionals, reflecting from the concepts of research and trend management, artificial intelligence and industry 4.0, perceiving the opportunity for improvement and adjustment of focus by micro and small companies for this type of industrial culture, expanding the competitive differential.
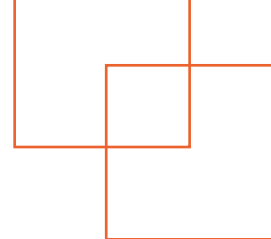
2 METHODOLOGICAL STEPS

This research seeks to understand how the company Coleção. Moda carries out the process of trend research with the use of artificial intelligence, correlating with models and methods of trend research that do not make use of this technology. The reflection has a basic purpose, with a qualitative approach and descriptive purpose, according to Gil's classification (2007), since it aims to understand how technology can contribute in the fashion and clothing sector. In regards to procedures, it relies on the methodology of bibliographic review and the technical procedure of semi-structured interview.

Through the bibliographic review, a theoretical and conceptual articulation between the different authors is sought in order to respond to the proposed intention. According to Lakatos and Marconi (2002), this strategy allows us to get in touch with every published theoretical reference, understanding what has already been researched, main conclusions and opportunities for new approaches on the same subject. Through an initial research plan - which identifies, locates and obtains the pertinent bibliography on the subject, and the presentation of a systematized text, evidencing the understanding of the authors' thinking plus their own ideas and opinions - the research is visualized in a global way, understanding the beginning, the middle and the end. In other words, it plans what to do, how to do it and which concepts to articulate.

In a pragmatic way, we revise the concepts of trend research from the authors Campos and Wolf (2018), Erner (2015), Rech (2013), Rech and Gomes (2016 and 2017) and Dragt (2017), industry 4.0 with the research of Silveira and Lopes (2019), Ferneda (2018), ABDI (2019) and Marger (2019) and artificial intelligence according to Kelly (2017) and Marques (2017; 2018).

In order to collect efficient data to have the amount of data needed to conduct the survey, there is the intention of using the technical procedure of the semi-structured interview, seeking answers from the subjective experience of the source, checking different ways of perceiving

and describing the research procedure and trend analysis from the AI in Coleção.Moda.

Thus, the interview is considered semi open with semi-structured questions following the script model and in-depth approach with indeterminate answers, according to Duarte's (2011) typology classification. As collection instruments, it is opted for interview carried out by technical device (mobile phone), with information recorded via audio and personal notes of the researcher, being analyzed and reflected in Coleção.Moda and Trend Research from the AI, with the creation and categorization of analytical structures that gather and organize the set of information obtained; the collection of information lasted two days (considering the sending of questions and receiving the answers by the researcher).
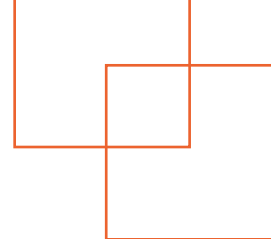
Then, the script of questions directed to one of the partner-owners of the company Coleção.Moda is as follows: (1) What is Coleção.Moda and what does it offer to the market? (2) What is the relevance of the use of trend research in fashion development for the apparel segment? (3) How is the process of trend research done by artificial intelligence in Coleção. Moda? (4) What are the advantages and disadvantages of using artificial intelligence to conduct trend research?

3 BIBLIOGRAPHIC REVIEW

From now on, the three theoretical concepts that support the present research are reviewed, using the methodology of bibliographic review, and which will later be of great value in the analysis and discussion of the collected data.

3.1 Trend Research

The word trend has different meanings, in different contexts, and in this study is explained as a synonym of movement, novelty, anticipation, uncertainty, photography of a given society and being in vogue (Campos; Cohen, 2018; Wolf, 2018; Erner, 2015; Flores, 2018; Rech, 2013; Rech; Gomes, 2016, 2017 and 2018; Dragt, 2017; Webb, 2016). From this angle, they can be seen as "phenomena that provide tangible evidence of social, relational and cultural changes" and have an "intricate life cycle, in constant evolution" (Rech, 2013, p. 109, our translation), their study and construction of a field of research in the initial phase and needs further investigation.

With a historical and also a contemporary perspective, "a tendency (in the general sense of the word) is the predisposition towards something, someone or some situation that will probably happen in the near future" (Campos, 2018, p. 19, our translation). That is, it is a paradigm that directs society's gaze, thought and attitudes in a direction, which may or may not be realized. In a complementary way, the word tendency approaches otherness, generating a "feeling of [a] finitude; that is, a situation that will be reached; and [b] futurology; that is, suggesting that the situation will happen in the future".
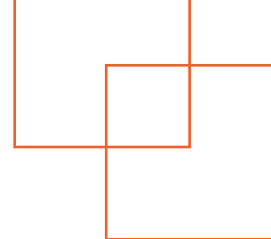
Trend research is defined as a set of methods, procedures and tools for identifying, understanding and disseminating trends (Gomes, Cohen and Flores, 2018). Maioli and Presotto (2012, p. 24, our translation) state that in order to carry out trend research "we must always approach different methodologies in a multidisciplinary way". Therefore, it is based on ethnographic studies, participant observation checking innovations driven by trendsetters, fieldwork instruments (qualitative and quantitative) and desk research based on semiotics.

Rech and Silveira (2017, p. 4) point out that trend research is based on a transdisciplinary logic, since as a field,

> [...] aggregate procedures and concepts from other disciplines and incorporate the oscillations of behaviors and consumption parameters, which makes it opportune to understand the consumer, plan consistent marketing strategies and identify patterns that can architect trends. (our translation)

Thus, the focus of this research is not guided by signs of a specific sphere, but it blends all those that can generate innovation, provoke change and tell stories about the future in a social context (Santos, 2017). Considering its characteristics and its respective area of research, it is understandable that the use of trends by professionals in the area of product development from different segments offers competitiveness to the extent that these can be understood as a picture of reality, in which it is possible to see what is happening, what ideas are giving movement to certain behaviors in a time-space frame and understand the different paradigmatic thoughts that guide the subjects (Rech; Gomes, 2016).

Not only that, but also "a trend is a social process that suggests a behavioral change based on emerging mentalities [...] revealing important and solid clues for innovation generation" (Rech; Gomes, 2016, p. 4, our translation). Having this in mind, not looking at trends

may mean ignoring clues, signs and manifestations of behavior patterns, new technologies and different consumer desires.
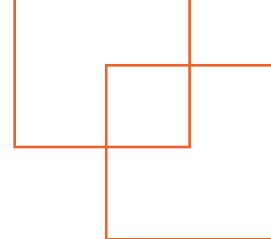
In addition, it is extremely important to use the results generated from trend research as a source of inspiration for product design. This is because trends are "focal points of desire, through which individuals very different from each other and without common agreement discover the same desires" (Erner, 2015, p. 9, our translation), that is, they are united by a certain idea.

Therefore, within the present study, it is important to emphasize that the set of tools, techniques and procedures organized to understand the trends that coexist in the social sphere collect inputs from different segments. These can be signs perceived in shopping habits in supermarkets, bookstores, shows...; subjects that provoke innovation from their way of dressing, thinking, creating...; even big brands that launch products, technology or goods that alter a pre-existing logic and establish a new pattern of behavior.

From these perceived signs, we understand which values and/or needs mean and, considering a large number of qualitative information, it is feasible to establish a pattern of repetition, from behavior, innovation, even to culture. And so, when placed in an atmosphere of change, one has the research of trends. However, it becomes crucial to follow this trend, since "'change is recurrent and underlines a scenario of mutations that takes shape from the 19th century" (Rech, Gomes, 2017, p. 24, our translation). In other words, the trend research of this study comprises socio-cultural trends, underlining the directions of human behavior within a social context with continuous observations on cultural, symbolic aspects, consumption habits of intangible products, among other sources of information.

3.2 Industry 4.0

The social, political, cultural and economic consequences arising after the Industrial Revolution in the 18th century are still present and overlap some characteristics with greater intensity, reaching and transforming different contexts and productive systems on a global level. Considering the time-space frame mentioned above, research from different areas agrees that there are four main industrial revolutions and, in 2019, we are living the fourth industrial revolution (Silveira; Lopes, 2019; Ferneda, 2018; Abid, 2019).

As the authors Silveira and Lopes (2019) point out, the first Industrial Revolution (also called Industry 1.0) occurred from 1780 onwards, inserting mechanical processes for the production of goods, the main ones being water and energy. This generated the expansion of production capacity, emphasizing an initial scenario of industrialization and manufacturing system, and the fusion of craft processes to mechanics. According to ABDI (2019), the textile industry was one of the sectors with the greatest influence of this period; as an example, we have the creation of the mechanical loom.
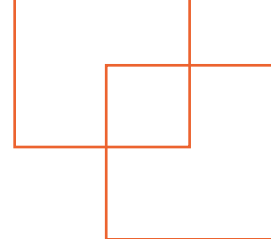
The second Industrial Revolution, from 1870 onwards, has as its main aspect the electrification of factories for the industrial process. This Industry 2.0 conquered a good status of excellence in speed and productive capacity and insertion of scientific methods during production. As Mager (2019, p. 28, our translation) points out, "the emblematic example is the assembly line developed by Henry Ford", reflecting a "concern with the aesthetic quality [of the products], affordable prices and demands of society", characterizing the mass production of industrial conglomerates (ABDI, 2019).

The third Industrial Revolution (Industry 3.0), which took place from 1970 onwards, was characterized by the introduction of automation in most of the industrial production system in an information technology context (ABDI, 2019). This means that computerized systems and processes enter the factories with the intention of automating demands that were previously mechanical/repetitive and made with human labor. This system, to a large extent, remains to this day and as an example we have the "robotic arms in the automotive production line assisting workers in power tasks" (Mager, 2019, p. 28, our translation).

In a historical context, the term Industry 4.0 first appeared at the Hanover Fair in 2011 in Germany with a group of researchers, led by Siegfrieg Dais and Henning Kagermann, who were working on a German government strategy project focusing on technology. In 2012 the same group presented some guidelines and recommendations for the implementation of this project and the following year, at the same fair, it presented a final dossier on the development and management of industry 4.0 (Marger, 2019; Silveira, Lopes, 2019).

When discussing Industry 4.0, it refers to the logic of achieving the fusion of the physical, digital and biological world, adding an exponential impact for all society. In national terms, the Ministry of Industry, Commerce and Services and the Brazilian Association of Industry developed a document entitled "Agenda para indústria 4.0" [1], as

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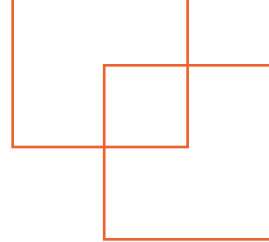1   "Agenda for industry 4.0" in English.

a way to prepare Brazil for the challenges of this new reality. This report articulates the objectives of merging the strategic areas, which are: "Additive Manufacturing (3D Printing); Artificial Intelligence; IOT (Internet Of Things), whose products, buildings and services have embedded technology, sensors and network connection, capable of collecting and transmitting data" (Mager, 2019, p. 30, our translation).

In addition, there are 6 principles that guide the implementation process of this industrial system, namely: real time operation capacity: information management in an instantaneous way; virtualization: allows the traceability and monitoring of all processes using sensors; decentralization: production processes are improved since the decision making process is automated via cyber-physical system and is organized according to the diagnosis of the production system in real time; service orientation: use of service-oriented software; modularity: production according to demand (Silveira; Lopes, 2019).

Finally, it is understood that industry 4.0 influences, to a greater or lesser degree, different segments, including that of fashion. There is already a constant frequency of research and brands that are using the tools and techniques of this industry for the production of goods and services, as well as the creation of new business models. Clothes designed and printed in 3D, garments with body temperature adjustment sensors, intelligent medical material that automatically releases drugs to the patient (such as dressings and bands) and use of artificial intelligence to capture inputs (trend research) for the development of garments are some examples that demonstrate this inclination of the fashion segment towards the 4.0 Industry.

3.3 Artificial Intelligence

In his book Inevitable: the 12 technological forces that will change our world (Kelly, 2017), the author presents different macro-trends that are now causing or will cause great impacts in our society. That is, "much of what will happen in the next 30 years is inevitable and is being defined by technological trends that are now already in motion" (Marques, 2017, p. 5, our translation); these twelve forces are defined through action verbs, characterized as directions for the future, being them: become, cognize, flow, visualize, access, share, filter, remix, interact, track, question and start (Kelly, 2017; Marques, 2017).
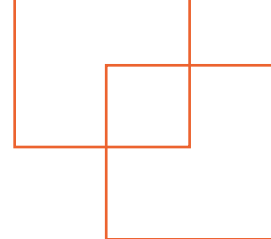
Kelly (2017,) sublinha que dentro desse movimento que está direcionando comportamentos, hábitos e inovações em diversos setores, uma tecnologia volta a ganhar relevância, espaço e investimento: a inteligência artificial; segundo o autor, a "Inteligência Artificial não nascerá em um super computador independente, mas no superorganismo composto de 1 bilhão de chips conhecido como internet" (Kelly, 2017, p. 33). Ou seja, agora há um processo de retroalimentação, na qual "em vez de ser toda programada por um humano, agora ela está sendo ensinada como aprender por conta própria" (Marques, 2018, p. 266) numa lógica de alimentação continuada.

Kelly (2017,) stresses that within this movement that is directing behaviors, habits and innovations in various sectors, one technology once again gains relevance, space and investment: artificial intelligence; according to the author, "Artificial Intelligence will not be born in an independent super computer, but in a superorganism composed of 1 billion chips known as the Internet" (Kelly, 2017, p. 33, our translation). In other words, there is now a process of feedback, in which "instead of being programmed entirely by a human, it is now being taught how to learn on its own" (Marques, 2018, p. 266, our translation) in a logic of continuous feeding.

As Marques (2018, p. 266, our translation) reflects, it is with the same logic that a little more than a century ago "the energy came to our homes through the outlet, allowing us to connect various equipment to the electrical grid, so it should also be with artificial intelligence (AI)". In this sense, artificial intelligence is understood as a set of algorithms organized with the intention of learning and generalizing knowledge to dedicate to the simulation of human capabilities (Kelly, 2017; Marques, 2017 and 2018). On a global scale,

> Artificial intelligence is already in our daily lives, such as Amazon, Netflix and Spotify recommendations, automatic Facebook and Instagram tags, or even the service of virtual assistants such as Siri, Cortana and Alexa, who act as a habit regulator, influencing our own behavior without this being noticed by ourselves. We are facing the cognition of anything, that is, any object, process or service can become intelligent when connected to a network powered by artificial intelligence (MARQUES, 2018, p. 265, our translation)

From these data, it is feasible to understand that AI is in a process of fusion with the physical world, articulated with the biological world

(human beings), equivalent to the logic of industry 4.0 commented previously (Norvig, Russel, 2004). In this way, it is clear the amplitude of this type of technology, in relation to the use and availability of AI to a large part of the population, through services and applications that contribute to the optimization of time in several areas, being this the focus of companies such as Google, Facebook, IBM, Apple and many others, according to Mitchell (1997).
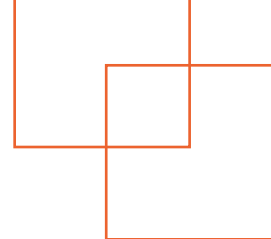
> Otherwise, the artificial intelligence applied to materials has been modifying weight, design, flexibility, durability, access, usability and other characteristics of many products [...]. Perhaps we are not noticing the proliferation of the technique in our daily life, since, as it expands, it also becomes common, ordinary. And further on, as it becomes unnoticed, that we do not notice it consciously, it acquires forms and the most diverse uses (Marques, 2018, p. 265, our translation).

Therefore, the dissemination of AI is already a materialized reality and, in the near future, its access will occur with low costs, optimizing different tasks due to its high processing capacity. In view of this, it can be seen that different market segments are incorporating AI in their commodities (products, services, digital applications), in a process that understands the essence of the task and creates algorithms capable of simulating human performance. As an example and object of this study, we have the company Coleção.Moda created in the city of Florianópolis/SC, which offers, among different services, the research of trends made by an Artificial Intelligence.

4 COLEÇÃO.MODA AND TREND RESEARCH FROM AI

After understanding the research problem, defining the methodological design to be followed, reviewing the concepts of trend research, industry 4.0 and artificial intelligence, it is possible to observe the initial structure of this article to then reflect on the data collected in order to understand how trend research using artificial intelligence can be done. For this, information from the interview with one of the founders of Coleção.Moda is used, analyzing the information by cross-referencing this data with the theories previously reflected.

The first guiding question of the interview sought to understand what

is Coleção.Moda and what this company offers to the market. According to the interviewee, Coleção.Moda is an online platform (software) for managing and organizing the process of development and production of clothing collection and apparel that began in the city of Florianopolis, Santa Catarina in 2018. This is possible from the project management using maps, technical sheets, division and visual boards that describe the concept of the collection (called moodboards), among other resources, in an automated, fast and digital way. In other words, it is a set of tools that makes the management of the beginning of a product's life cycle, offering greater control to all those involved in the process.
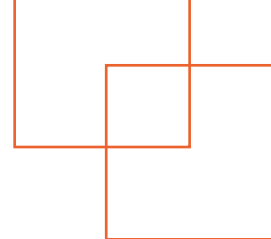
Together with this platform, the artificial intelligence technology is integrated to indicate trends, working from the supply of data from major brands during fashion weeks in a seasonal way. In other words, the AI is filled with photos of the looks that appear on the catwalks of fashion shows and the processing, analysis and interpretation of this data occurs. Therefore, there is an understanding, by the logic of the AI, of the colors that appear more frequently, patterns and prints, formats and design of the pieces and main items.

Through this, there is the indication of important information, released in those shows, materialized in reports for the clients who use the service. With this data, there are directions that are useful in the process of creating a collection or a specific product, in a movement to carry out the management and use of these trends indicated for the creative and innovative process.

When asked about the relevance of using trend research in the development of products for the fashion market, the interviewee mentioned that this research is crucial. That is, it enables the understanding the diagnosis of the behavior of the target audience of a given brand, what shapes, colors and textures with greater inclination to use with behaviors emerging from different subjects and that are gaining strength.

Having understood this, it is possible to develop a product with greater assertiveness, since it is in accordance with the behavior of the final consumer, always considering a time-space frame. Thus, with the understanding of the customer's needs, it is possible to anticipate solutions to meet these demands that arise constantly in the market, optimizing production and increasing sales to this customer.

Regarding the third question, the source highlighted that the IA is a means between the trends and customers who use this service of Coleção.Moda, from the perspective of major brands. This process of analysis made by IA was possible through a movement to teach and train these

algorithms to recognize patterns, shapes, colors, textures and types of people in photographs made in fashion shows and events, focusing on models on the catwalk. After that, in an automated and dynamic way, the AI elaborates reports containing information of colors and design shapes that appeared with greater intensity, classifying all this data in order of importance.

Considering the logic described above, it is understood that the analysis and search for repetitions in 500 photographs of an important fashion show in Paris week, for example, can be done by trend researchers or coolhunters. However, the automation and speed present during the AI work is clearly greater when compared to human effort. In view of this, the use of this technology for the mapping and indications of trends launched in shows of the segment is seen as advantageous.

Moreover, in relation to advantages and disadvantages in the use of this tool, the interviewee mentioned the speed and automation of the process of analysis of a large number of information and data collected. In this sense, it is important to stress that the process of trend research is done by human hands, and the AI is a tool that optimizes the process of analysis, understanding this task as repetitive, when using the software of Coleção.Moda.

Finally, the source of the research underlines that this technology aggregates the process of research and management of trends, since one can cross information coming from the main shows of the world with data on consumer behavior, technological innovations, and changes in the creative scene that the profile of the public of a certain brand is influenced by, among other possibilities. In summary, table 1 presents some specific characteristics of trend research that do not make use of artificial intelligence during the research and what is done by Coleção.Moda.

Table 1: Characteristics of trend research

Category	No AI	With AI
Possbile indications	Behaviors, purchase habits, mood of the moment (Morin, 1997)	Colors, design and texture of runway looks
Origin of data collected	Fairs, events, technological segment, shows, libraries, reports, summaries, market researches, among others	Photographs of runways shows from fashion events

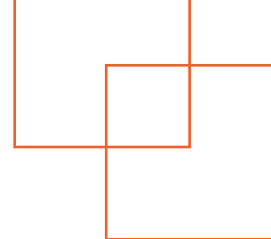| Analysis process	Sign interpretation, construction of narratives, crossing of previous data	Specificl indications (color, design, textures) with more frequency and identification of patterns
Amplitude of research	Wide	Restricted

Source: created by the authors, 2019.

After the table analysis, some considerations are possible: the use of the AI for trend research optimizes the process of analysis of a large number of data; the AI can be a factor of competitive advantage in the research and management of trends, since it makes it automated, fast and assertive; the research of trends made by the AI within Coleção. Moda is restrictive while only looking at runway photographs; this type of technology can be used to confirm trends that are manifested in apparel products presented by large brands in runway looks; small companies can use this type of technology to create innovative solutions that meet the needs of the target audience.

5 FINAL REMARKS

By way of final considerations, this article investigated the trend research service made with algorithms integrated to an artificial intelligence by the company Coleção.Moda of Santa Catarina. In other words, it was understood how companies in the fashion and/or clothing segment and their different moments of the respective productive chains are adapting and merging with new industry technologies 4. 0; the case analyzed corresponds to the initial process of seeking information (called inputs) to understand colors, patterns of repetitions and shapes investigated in pieces presented in fashion shows, reaching the development of new products (outputs); in this specific case, after analysis of different photographs of the looks presented by clothing brands with worldwide reference, it is stressed that the outputs generated are reports with indications of the main colors, textures and shapes present in the fashion shows, being used as a parameter in the development of new products.

To support the proposed problem, it was necessary to review the concepts of trend research from the perspective of Campos and Wolf

(2018), Erner (2015), Rech (2013), Rech e Gomes (2016 and 2017) and Dragt (2017), industry 4. 0 according to Silveira and Lopes (2019), Ferneda (2018), ABDI (2019) and Marger (2019) and artificial intelligence according to the reflections of Kelly (2017), Marques (2017; 2018), Mitchell (1997) and Norvig and Russel (2004). In addition, an interview was conducted with one of the founders of the company Coleção.Moda; the data collected were analyzed and reflected in line with the theoretical bases, aiming to reach some embryonic conclusions.
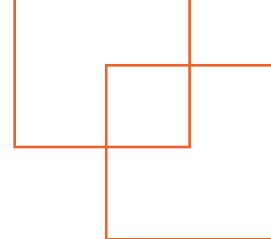
Using a synthesis exposed in table1, it was realized that trend researchers can aggregate in their research methods technologies that belong to industry 4.0, such as artificial intelligence, proposing greater agility and automation of the process. Moreover, it is understood that the area of research and trend management is structured in a transdisciplinary logic, reaching the sphere of algorithms and technology of high processing capacity in this case. Also, it was observed that the trend research made by Coleção.Moda has a focus on information coming from fashion shows, not observing signs of new trends in other contexts, such as fairs, shows, museums, and advertising, among others.

Finally, it is understood that the theme proposed throughout this study needs further reflection, since it is an initial research on the theme, with timely efforts to understand how this area of research can be integrated with the other technologies of the fourth Industrial Revolution, access to micro and small businesses to use trend information as a way to maintain a competitive edge from AI, the use of a technology that accompanies the constant changes of a polarized and constantly changing world, and also the influences that the 4th Industrial Revolution, and its different technologies and solutions, are shaping the future of work in the fashion and clothing sector.

REFERENCES

ABDI; Ministério da Indústria, Comércio e Serviços. **Agenda brasileira para a indústria 4.0.** Disponível em: http://www.industria40.gov.br/. Retrieved: 4 Jun. 2019.

CAMPOS, A. Q: WOLF, B. O Conceito de Tendência na Moda: significado, histórico, conotação. ModaPalavra e-Periódico. v.6, n.11, p. 11-30, jul-dez. **Dossiê Estudos de Tendências e Branding de Moda**, 2018.

DRAGT, E. **How to research trends: move beyong trend watching to kickstart innovation.** BIS Publishers, 2017.

DUARTE, M. Y. M. Estudo de caso in DUARTE, Jorge, BARROS, Antonio. **Métodos e técnicas de pesquisa em comunicação.** 2. ed. - 5. reimpr. - São Paulo: Atlas, 2011.

ERNER, G. **Sociologia das Tendências.** São Paulo: Editora G. Gili, 2015.

FERNEDA, R. **Adoção de tecnologias da indústria 4.0 por firmas do agronegócio do Rio Grande do Sul.** Dissertação [Mestrado em Economia] - Universidade do Vale do Rio dos Sinos – Programa de Pós-graduação em Economia. São Leopoldo, p. 131, 2018.

GIL, A. C. **Como elaborar projetos de pesquisa.** 4. ed. São Paulo: Atlas, 2007.

GOMES, D. dos S; Inteligência Artificial: conceitos e aplicações. **Olhar Científico.** v1, n. 2, p. 234-246, ago-set, 2010.
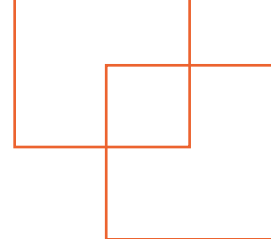
GOMES, N. P., COHEN, S. A DE M., FLORES, A. M. M. **Estudos de Tendências:** contributo para uma abordagem de análise e gestão da cultura. In: ModaPalavra e-periódico. Dossiê Estudos de Tendências e Branding de Moda. v. 11, n.22, p. 49-81, jul-dez., 2018.

ICHI, F. S; VANDOSKI, E; KAMINSKI, R. A; SILVA, R. A. Indústria 4.0 no Brasil: Como este novo conceito pode transformar o processo de produção no Brasil. In: VIII CONGRESSO BRASILEIRO DE ENGENHARIA DE PRODUÇÃO, 2018., Ponta Grossa. **Anais** [...], 2018.

KELLY, K. **Inevitáveis:** as 12 forças tecnológicas que mudarão nosso mundo. São Paulo, HSM Editora. 2017.

LAKATOS, E. M.; MARCONI, M. de A. **Técnicas de pesquisa:** planejamento e execução de pesquisas, amostragens e técnicas de pesquisas, elaboração e interpretação de dados. 5. ed. São Paulo. Editora Atlas, 2002.

MAGER, G. B; O Design e a Indústria 4.0. In: **Revista Hallceart** #05.

Florianópolis: UDESC, 2019.

MAIOLI, F. M; PRESOTTO, J; PALMA, C. **Coolhunting:** Métodos e Práticas/ Maioli, Presotto & palma: Milão, 2012.

MARQUES, M. S. C. A inevitável conexão - entre Moda e tecnologia - que moldará o futuro. In: 13° Colóquio de Moda- UNESP Bauru, São Paulo, 2017. **Anais** [...]. Available on: http://www.coloquiomoda.com.br/coloquio2017/anais/anais/13-Coloquio-de-Moda_2017/GT/gt_9/gt_9_A_INEVITAVEL_CONEXAO_ENTRE.pdf. Retrieved: 10 may 2019.

MARQUES, M. S. C. Moda e tecnologia: a inevitável conexão que moldará o futuro. **dobras e-Periódico.** v. 11, n. 23, p. 254-270, 2018.

MORIN, E. **Cultura de massas no século XX:** o espírito do tempo. Rio de Janeiro: Forense-Universitária, 1977.

MITCHELL, T. **Machine Learning.** New Yourk: McGraw-Hill, 1997.
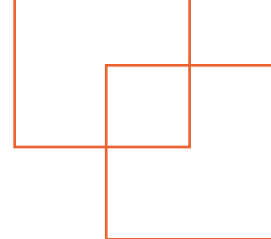NORVIG, P.; RUSSEL, S. Inteligência Artificial. 3 ed. - Campus, 2004.

RECH, S. R. Estudos do Futuro & Moda: uma abordagem conceitual. **ModaPalavra e-Periódico.** v.6, n.11, p.93-100. jul-dez 2013.

RECH, S. R; GOMES, N. P. Anatomia das tendências e o desenvolvimento de produtos de moda. In: **12° Colóquio de Moda** – 9° Edição Internacional – 3° Congresso de Iniciação Científica em Design de Moda, 2016.

RECH, S. R; GOMES, N. P. Mente Coletiva e Análise de Tendências: uma exploração relacional. In: Rech, Sandra (org). **Seminário Nacional de Pesquisa e Extensão em Moda: descolamentos**, 2017. p.22-33.

RECH, S. R; SILVEIRA, I. Abordagem terminológica dos estudos de tendências. In: 13° Colóquio de Moda- UNESP Bauru, São Paulo, 2017. **Anais** [...]. Available on: https://www.academia.edu/35337128/ABORDAGEM_TERMINOL%C3%93GICA_DOS_ESTUDOS_DE_TEND%C3%8ANCIAS. Retrieved: December 2018.

SANTOS, J. **Sobre tendências e o espírito do tempo.** São Paulo: Estação das Letras e Cores, 2017.

SILVEIRA, C. B; LOPES, G. C. **Indústria 4.0.** Disponível em: https://www.citisystems.com.br/industria-4-0/. Retrieved: 1 June 2019.

SILVEIRA, I. **Procedimentos metodológicos de pesquisa:** ciência e conhecimento. Florianópolis: 2018. (Apostila do Programa de Pós-Graduação em Moda, Mestrado Profissional em Design de Vestuário e Moda, PPGModa/UDESC).

STUMPF, I. R. C. Pesquisa bibliográfica. In: DUARTE, Jorge; BARROS, Antonio (Orgs.). **Métodos e técnicas de pesquisa em comunicação.** 2. ed. São Paulo: Atlas, 2010.

WEBB, A. **The Signals are Talking:** why today's fringe is tomorrow's mainstream. New York: PublicAffairs, 2016.
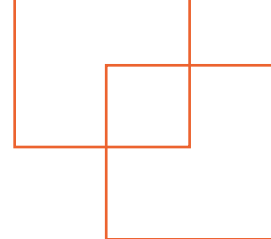
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